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THE FARMER'S DIGEST

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THE HIGHSMITH COMPANY
Fort Atkinson 21, Wisconsin

The Farmer's Digest

Volume 23 January 1960 Number 7

Your Chances Of Making Money In 1960

See how your products shape up. Beef won't do as well; hogs should turn the corner. Feed grains will slip . . .

Condensed from Farm Journal

Claude W. Gifford

SMALLER cash sales for wheat farmers, egg producers and hog raisers knocked the bloom off farm income in 1959.

Realized net income from farm products alone was estimated to total about $11.2 billion — 15% less than 1958's $13.1 billion and slightly more than 1957's $11.0 billion.

This was partly offset by farmers' collecting about $6.5 billion from off-farm sources — that's $200 to $300 million more than 1958. Other payments and inventory changes brought the total '59 farm income to about 20.5 billion. It was $22.2 billion in 1958 and $19.9 billion in 1957. However, there were fewer farmers dividing up the pie in 1959.

Chief reasons for the smaller realized net income in 1959 were:

- Farm costs were about 3% higher — thus adding about $700 million to farmers' bills.
- The Government payed out $500 million less in Soil Bank payments, since there was no Acreage Reserve in 1959.
- Prices for crops ran about 2% under a year ago; livestock prices were off 5%, largely due to the break in the hog market. Thus, cash receipts for the first nine months of 1959 totaled $557 million less than in the first nine months of 1959.

It's going to be easier for some farmers to make money in 1960, given normal weather. But for

Reprinted by permission from Farm Journal, Philadelphia 5, Pennsylvania

most it will be a year about like 1959. It won't be as good a year for beef, and this — coupled with low-cycle hog prices most of the year — could knock another $1 billion off realized net income from farm products in 1960, USDA economists think.

The favorable signs for 1960 shape up this way:

- A strong market for U. S. farm products overseas.
- Continued high consumer incomes and a growing population.
- More income for farmers from off-farm sources.

The Foreign Agriculture Service believes that we'll sell $4 billion worth of farm products overseas from July of this year until June 30, 1960. This would be the third highest dollar volume on record. Export demand will be strong for cotton, fats and oils, fruit, vegetables, rice and feed grains. Part of this is due to a severe drouth in Western Europe.

The demand for farm products was booming until the steel strike came along and has held up surprisingly well since. When steel workers walked out, industrial production stood 17% higher than a year ago; employment was up 2½ million to a new high; unemployment was reduced by 1½ million; and consumer incomes after taxes had increased 7%.

The potential wealth that was not produced during the strike is bound to hurt some. Still, government economists expect the economic pace to quicken into 1960 and predict a "further climb in purchasing power to a new high."

Farm cost rates will go up too. Fortunately, this year's 2½% boost is a smaller rise than in 1957 and in 1958. Taxes, wages for farm help and interest costs made the steepest climb this year.

Farm prices won't change as sharply in 1960 as they did this year, say USDA economists. Hog prices in 1959 nose-dived to a level that will average about 27% below 1958. Chief reason: 13% higher pork marketings for the year.

One American farmer out of every six will suffer a disabling injury this year. The accident rate among farmers is four times as high as among factory workers.

Egg prices in 1959 will slip 17% below 1958 on 3% higher sales. Broilers will average 15% lower prices because of 4% higher production.

Prices for cattle and calves will

average about 9% higher for 1959 as a result of 10% lower marketings for the year.

Now for a closer look at several major commodities:

Beef Cattle

Supplies: Look for a big increase in cattle numbers this year, possibly 5 million more than the 96.8 million of last Jan. 1. This will be an increase of more than 8 million head in two years time. The supply of steers and heifers is building up faster than in any previous cycle. Also more beef output per cow is raising beef production faster than cow numbers.

Outlook: You can expect slaughter to increase faster in this cycle. Beef available for consumption will likely climb from 81 pounds this year to 83 pounds in 1960. Any gain in cow slaughter is expected to be modest.

Agriculture uses 50 million tons of chemicals annually, and more electric power than Chicago, Detroit, Houston, Baltimore, and Boston combined.

Average prices for the year are likely to be lower — but should be in the nature of an "adjustment."

Hogs

Supplies: The large fall pig crop of about 45 million head — up 2.8 million from last fall — will mean more hogs for slaughter during the first half of 1960. The spring crop of '60 may be close to the large 58½ million farrowings in 1959. More sows will go to slaughter in '60, thus adding to pork supplies. But an increasing population may hold per capita supplies at about this year's 67 pounds.

Outlook: Hog prices will average lower for the first half of the year and perhaps about the same as '59 in the last half. Prices for all of 1959 will average around $14.50 — down more than $5 from last year. Feed in '60 will be somewhat cheaper. All in all, a very tight year for hogs; but the cycle should turn the corner in '60.

Dairy

Supplies: Milk production has dropped from 125.7 billion pounds in 1957 to 124.7 billion pounds in 1959. It may increase slightly next year. Production and demand in 1960 are expected to be in better balance than in any of the last seven years. CCC holdings of butter and non-fat dry milk have been completely exhausted; cheese at very low levels. CCC purchases should dwindle even further.

Outlook: Milk and butterfat prices should be higher in 1960. The volume of dairy products sold is likely to reach a new

HOW CASH RECEIPTS COMPARE

FARM PRODUCTS	1958	1959
	1st 9 months (Millions)	1st 9 months (Millions)
Meat Animals	$ 8,056	$ 7,832
Cattle and Calves	5,277	5,481
Hogs	2,517	2,103
Sheep and Lambs	262	248
Poultry and Eggs	2,399	2,063
Eggs	1,332	1,107
Broilers	792	707
Turkeys	133	132
Farm Chickens	100	77
Other	42	40
Dairy Products	3,461	3,447
Other Livestock	222	229
TOTAL Livestock	$14,138	$13,571
Feed Grains	1,641	1,587
Corn	956	1,042
Grain Sorghum	315	207
Barley	201	186
Oats	169	152
Other Field Crops	3,553	3,550
Wheat	1,787	1,601
Cotton	706	850
Tobacco	529	527
Soybeans	442	425
Rice	103	90
Peanuts	86	57
Vegetables	1,224	1,223
Fruits and Nuts	1,068	1,163
Other Crops	1,134	1,207
TOTAL Crops	$ 8,720	$ 8,720
TOTAL Cash Receipts	$22,858	$22,301

high, resulting in record-high cash receipts from dairying. Feed prices will be lower but other expenses a little higher. Net income should rise.

Poultry And Eggs

Supplies: The egg-laying flock will be smaller in the first six months of 1960. Broiler growers show signs of cutting production below last year in the early months of '60. Turkey numbers may be down some next year.

Japan has only about 15 million acres of tillable land, and their farms average 2½ acres.

Outlook: Chances are good for higher average prices for broilers, eggs and turkeys in 1960.

Wheat

Supplies: This year's normal yields made a crop of 1.1 billion bushels — 24% smaller than last years' record-smasher. Carry-over at the start of the marketing year in July stood at 1.3 billion bushels. On Oct. 1 the CCC owned 1.1 billion bushels. The carry-over next July 1 is expected to be 1.4 billion.

Outlook: We'll use about 629 million bushels in the United States this marketing year — the same as last year. We'll export about 410 million bushels — down 33 million bushels. Price supports on the '60 crop are set at $1.77 compared with this year's $1.81. The national allotment is again 55 million acres.

Feed Grains

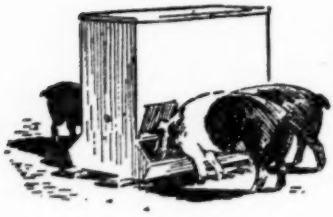
Supplies: This year's record feed grain crop reached 167 million tons — nearly 10 million tons larger than last year, and 38 million tons larger than the 1953-57 average. The livestock units to be fed this season (Oct. through Sept.) will total 176 million units — up 3% from last year's 171 million. Still, prospects are that feed grain carry-over next October will move from this year's 67.4 million tons to 80 million.

Oats, barley and grain sorghum output this fall are smaller than a year ago — but this is more than offset by the 4.4 billion-bushel corn crop, which is 17% larger than last fall due to 15% larger acreages.

Columbus brought horses, pigs, chickens, rabbits, sugar cane, wheat, oats, and rye to the new world. The Indians soon learned to prefer beef to other humans, and thus, lessened their cannibalistic tendency.

Outlook: Exports reached a new high of 12.8 million tons in the last feeding season and should continue near this record level. Prices are likely to average a little lower. Supports on corn will be set somewhere between $1.05 and $1.09 for 1960.

Drylot Hog Feeding Expands



Thousands of hog men are moving their pigs to concrete . . .

Condensed from Prairie Farmer

Jim Lilly

SKILLED management plus concrete are revolutionizing the hog business.

Thousands of hog men are moving their pigs to year-round drylot. What's more, even in the face of low hog prices, they are expanding and building up their feeding operations.

One of the big bugaboos about modern confinement systems has been the general lack of good information on design principles for the feeding floor and feeding systems. Even the best current rations to use for confinement feeding have not been thoroughly tested.

Actually, there have been many fragments of information available on confinement feeding practices. Let's review some of those along with the more current recommendations from the universities to see if there isn't some good general information about drylot feeding.

Limited Feed Choice

How about feeds? First of all, you are just about limited to the ground and mixed complete rations or a shelled corn-protein supplement free-choice ration. Corncobs are awkward to handle in these newer concrete drylot setups. If you are using liquid manure, it's next to impossible to handle them.

Complete ground and mixed rations look good when you are working with dry corn. University of Illinois drylot tests over a period of years have generally indicated that a complete mixed ration will produce more rapid gains at roughly the same feed efficiency as do the free-choice rations.

The corn-soy complete rations really shine in drylot feeding. They give you rapid economical gains. The comparative low cost of soybean oilmeal makes the corn-soy combination particularly

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attractive in low-price periods.

The one big thing to remember about corn-soy rations is that they must be adequately fortified with minerals, vitamins A, B, and D, and antibiotics. Without these essentials you get a reduced rate of gain and feed efficiency compared to the older soy-tankage type supplements.

Protein levels recommended are 16 percent for pigs from weaning to 100 pounds and 12 percent for pigs from 100 to 200 pounds. Protein is important in drylot feeding. The pigs can't make up a protein deficient ration in drylot like they do on a pasture-feeding system.

The Other Choice

The other combination open to drylot feeders is shelled corn and supplement fed free-choice. Any free-choice system is a potential trouble spot from the supplement-consumption angle. Excessive supplement consumption runs up the cost of gain and plays hob with feed efficiency.

Sometimes, mixing the supplement and corn together, particularly if you have a meal-type supplement, will help cut excessive protein consumption. Pelleted supplements don't work quite so well mixed in shelled corn, since the pigs can separate them more easily than the meal types.

Feeding systems themselves may dictate your choice of ration. High-moisture corn is popular now, but it doesn't make a good complete mixed ration. If you plan to use high-moisture corn you are almost forced to self-feed corn and supplement free-choice. Dry corn, of course, is ideal for the complete mixed ration.

Feeding systems pose more problems than just choice of rations. High-moisture corn spoils easily when you expose it to air. The most successful wet corn feeders are geared to feed daily. This means that your storage capacity in feeders is limited.

Automatic unloading wagons work well with wet corn but they are an everyday process. The best system for wet corn seems to be some type of an automatic auger system that you handle with pushbuttons.

Surface drainage refers to water removal from the surface of a field. Subsurface drainage is lowering the water table below the root zone of a crop.

Dry feeds are a little more flexible. Here you can use the small automatic grinding mills that will fill feeders automatically. Another way to handle dry complete feeds is to grind large quantities at one time, then fill feeders on a weekly basis.

The two knottiest problems about confined feeding don't fall in line as easily as choice of rations. Most confinement feeders say manure handling and feeding floor design are their worst problems.

Liquid manure is the newest of the handling systems now in use on most confinement floors. The feeding floor is scraped and washed every two or three days. The manure is usually washed into a pit where it is collected for hauling.

Farm and city people need to get together and learn more about each other. They need to glean facts instead of rumors — friendships instead of misunderstandings.

The pits should have a capacity large enough to handle at least a week's supply of manure. Capacity should be figured on the basis of two gallons per hog per day.

Moving the liquid manure from the storage tank to the field is another major problem for many confinement feeders. You have to have land available where the manure can be spread. Also, wet weather can hold you off the fields and you may run into trouble with a prolonged wet spell.

Despite the problems, most feeders like their liquid-manure systems. They say scraping and washing the floor takes only a few minutes a day. With improved manure-handling devices, emptying the tanks and spreading the manure is not much of a problem, they say.

Three Ways To Empty Tanks

Three types of systems are used to empty the tanks. One of the first was the diaphragm pump. These pumps handle both liquids and solids easily and most farmers using them report they work well. They are slightly more expensive than some of the other handling systems.

Another system is a vacuum loader. Here, a sealed tank is used to haul the manure to the field. By creating a vacuum in this tank, either by using a tractor or truck engine, or a vacuum pump, manure is pulled from the storage tank. This system works easily and quickly, but sealed tanks can be expensive.

The third loading system is an ordinary grain auger. One successful Illinois feeder uses a four-inch auger powered by a one-horsepower electric motor. The 16-foot auger handles the manure easily and it is not an expensive unit.

There's another development in straight liquid-manure handling that is worth watching. One

Illinois hog man and several in Missouri are pumping liquid manure directly into lagoons or settling ponds. They are working on the concept that manure-handling costs outweigh the fertility value once you get manure to the field.

Good System In Summer

After the floor is scraped and washed, the manure is flushed through tile lines or onto a concrete runway. Once in the lagoon, bacteria take over and the manure is decomposed in a short period of time. The system should work well in the summer, but even some of the sanitary engineers who designed the units are wondering what will happen in the winter.

Odors or flies are no problem, according to the feeders using the lagoons. They say bacterial decomposition of the manure in the summer is accompanied by the formation of algae. These algae provide oxygen and the oxygen-using bacteria that decompose manure do not produce methane or other smelly gases.

Manure can also be handled in a combination of liquid and dry material. The liquid portion of the manure is drained off into pits, while the solids are scraped off, then loaded into an ordinary spreader. One advantage of this system is that you do not need the storage tank capacity you must have with the straight liquid-manure system.

Feeding-floor design is another factor that puzzles a lot of hog feeders. Floor slope varies, but most successful confinement men end with slope of ½ inch per foot in the bedded area. ¾ inch per foot in the dunging area. and ¼ inch per foot in the gutter used to carry off the manure.

Space needed for hogs in the bedded area or in the feeding area is still hooked to some old recommendations. Most universities recommend 6 to 8 square feet per pig in bedded area and 7 to 9 square feet per pig in the feeding area, depending on pig size.

Two Ways To Go

Some time ago Bernard M. Baruch, adviser to Presidents and often referred to as "America's elder statesman," presented a concise analysis of one of the most pressing economic problems confronting this country. Said this wise student of public affairs: "We have two ways to go: We can produce less for more money, have higher prices, and have less; or we can produce more for the same money, have lower prices, and have more." —*Sunshine Magazine*

Chimney Smoke

by Irene Rudie

According to a recent survey, more than 75% of the nation's husbands are said to help with the dishes. It surely can't include farm husbands, but according to my own little private survey of the neighborhood, 70% of the farm wives help with the chores.

★ ★ ★

Styles in names for children change, and so do names for dogs. One hardly ever hears of a dog named Fido these days, or Prince, or Duke, or Rover.

★ ★ ★

Houseplants turn naturally to the light and their best side is seen from outside the window, just as some people turn their most pleasant sides to those outside the house and family.

★ ★ ★

I've never heard the wailing of a Banshee, but I can easily imagine it to be the sound coming from our woods as a chain saw bites its way through the trunk of a hard maple tree.

★ ★ ★

Corncobs and hay littered the barnyard, and fallen leaves messed up the lawn. Overnight, a forgiving layer of soft, white snow fell and made the farm clean and new again.

To appreciate today's bright and marvelously fast colors, here's a hint from an old book: "To wash colored fabrics, soak them in water to which ox-gall has been added. A teacup of lye improves black colors, and a strong teacup of common hay improves French linens; use vinegar in the water for pink and green, and soda for purple and blue".

★ ★ ★

Folding and re-stacking of rumpled merchandise on a store counter makes it more attractive to customers, just as an occasional stirring of mash in the hoppers makes it more attractive to the hens.

★ ★ ★

Farm experts now advise us to "lay in machinery repairs that will be needed during the coming growing season." They fail to tell us, however, which parts are going to break down!

★ ★ ★

When a winter storm shuts off the power and the family has to rely on its own resources for entertainment, take out a book of poetry and read "Snow-Bound" aloud. Detours will have to be made to explain words like bridle-post, well-curb, or sty.

The Golding Test . . . For Solids-Not-Fat

Equitable payment for milk solids is long overdue . . .

Condensed from Western Dairy Journal

Louis J. Manus, Dairy Department, State College of Washington

THE milk producer and milk processor have long sought a formula which would give a fair payment for milk.

In the past as well as today milk is evaluated on the basis of its fat content. This method of evaluation was a natural development because of the ease in determining percentage by separating out, concentrating, and measuring the fat.

NFS Importance

Studies show the energy content of milk is about evenly divided between fat and nonfat solids (NFS). However, nutritional research shows the NFS are much more important than the fat.

Some of the reasons for the above statement are:

1. Approximately one-third of the NFS is protein. Milk protein ranks with other animal proteins, such as meat, eggs, and fish as being proteins of the highest quality containing all the essential amino acids in relative abundance.

2. Milk and its products are the chief nutritional sources in the United States of dietary calcium, 75% of which is furnished by milk and milk products.

3. Milk and milk products supply nearly 50% of the nation's supply of riboflavin. Meats and grains are next highest sources, each supplying about 15%.

4. Milk supplies significant amounts of other important minerals and vitamins as well as the carbohydrate lactose.

The above simply points to the need for a more equitable method of determining value of milk sold by the producer. Once such a method is devised the consumer also will benefit as milk would be sold on the basis of NFS as well as fat content. Various methods and formulae have been tried to achieve rapid determination of NFS content of milk. None have been satisfactory for

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Western Dairy Journal, 4511 Produce Plaza, Los Angeles 58, California

practical routine use. Methods proposed were either too time consuming and/or inaccurate.

Golding Research

In 1953 Dr. N. S. Golding began his work at Washington State College, Pullman, to develop a NFS test which would be as accurate and speedy as the Babcock fat test. Development of this test, based on specific gravity, is now in the pilot stage.

Specific gravity determination of a milk sample is accomplished by using 10 pea-sized plastic spheres. The spheres are made from a plastic called "Cymac 400" plus calculated amounts of barium sulphate to yield units with specific gravities ranging from 1.025-1.034 with .001 variation between each successive gravity. Spheres for each gravity are distinctly colored for identification purposes.

The coefficient of expansion of this plastic is unique. It is practically the same as that of the milk at roughly 68 deg. F. This means that no serious error is introduced if the temperature of the milk is within 1 deg. F. of the standard 68 deg. F. at the time of determining specific gravity.

Essential parts of the test equipment are the 10 graded specific gravity spheres in a straight-sided, 4 ounce sample bottle. Accidental loss of the spheres is prevented by a plastic snap-in grid. Other equipment includes water baths for tempering samples, a glass shelf and a mirror with which to easily detect the number of spheres that sink to the bottom of the sample. Babcock test equipment is required for the fat determination. A table of calculations is used as a quick means of determining the NFS.

Procedure

Two-ounce samples are sufficient for determination of specific gravities (number of beads sinking) and the Babcock fat tests. Test procedure is as follows:

1. The samples are warmed to 104 deg. F. and held at this temperature for 5 minutes to insure liquefying the fat. They are then mixed with a rotary motion, and cooled in a water bath to 68 deg. F.

2. The samples are mixed once more and milk is drawn for the Babcock test at this time. Samples are placed on a glass shelf and spheres are allowed to come

A Tennessee test showed that raising of crossbred pigs is more profitable than straightbreds; productive purebreds, however, formed the base for the effective crossbreeding program.

to equilibrium in the milk.

3. With a mirror the number of spheres are counted which sink to the bottom. As a check, the floating spheres are counted. Total of the two counts, of course, should be 10. Occasionally a sphere will have almost exactly the same specific gravity as the milk and remain in the body of the milk sample. A remixing of the sample will often cause the sphere to sink to the bottom or rise to the surface of the sample.

4. The number of spheres which sink to the bottom determines specific gravity of the milk at 68 deg. F. and specific gravity of the milk is the same as the keyed specific gravity of the lightest sphere sinking.

5. The NFS content is calculated by use of this formula:

NFS = 0.25D + 0.22F + 0.72

D = (Specific gravity X 1000 — 1000.

F = Per cent fat

0.72 = constant

However, a table of pre-calculated values based on the above formula is available.

Reference values needed are the number of beads sinking and percentage of fat in the sample.

Experiments: The Golding NFS test is currently being checked by a number of experiment stations throughout the country. Health Departments are also experimenting with the test as a screening method for sorting out suspected lots of watered milk with considerable success.

Milk from individual cows is being tested cooperatively with DHIA testers. Results indicate management of some herds has tended to develop animals of high volume production often without regard to the solids content of the milk.

Milk of many individual cows was found to contain less than 8.0% NFS, and as little as 7.4%. On the other hand, milk from some individual cows of the Channel Island breeds contained as much as 10.5% NFS. All of these tests were checked against official gravimetric determinations for total solids.

A relatively new herbicide, 2, 4-DB, shows great promise as a post-emergence herbicide to control broadleaf weeds in alfalfa, red clover, birdsfoot trefoil, and alsike clover.

Accomplishments

The Golding NFS Test, in conjunction with the Babcock fat test, should be extremely useful. It does not require highly skilled technicians. All that is needed is common sense and attention to a few details.

In the hands of the DHIA tester it should develop valuable

information aiding dairy herd owners or herd managers in the selection of animals in the breeding program. Literature indicates that production of protein and other NFS in milk is as much a genetic factor as is the production of fat.

Regulatory officials welcome a rapid test for NFS. This is particularly true in screening milk supplies for added water.

Most important, payment for milk on the basis of protein and other NFS as well as for fat content is long overdue. When the NFS can be determined as simply as the fat it will be easy to determine equitable milk value. When milk is paid for on the basis of fat and NFS, temptation to build a "base" by watering will be removed. Equitable payment for milk solids, to start with, is the test's most valuable potential.

Research On Dairy Heifer Growth

It probably doesn't pay to grow dairy heifers too rapidly, according to recent research. J. K. Loosli and J. T. Reid, Cornell University feeding specialists, have told of experiments conducted since 1948, using three different levels of feeding for Holstein heifer calves.

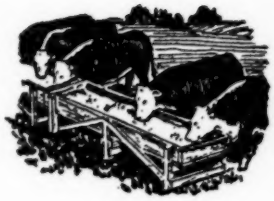
A high level of nutrition gave rapid growth, early calving, and large mature size. But milk and butterfat production after the second calf wasn't as good as for heifers grown out with less feed.

On the other hand, a very low level of nutrition produced stunted heifers and delayed maturity, Loosli and Reid found. But when these heifers were fed normally after their first calf, they milked well and grew to normal size by the second or third lactation. First calves were small, and the stunted heifers had more trouble in calving.

The high nutrition group received 50 per cent more total digestible nutrients than is normally recommended. Actually, from birth until just calving, these heifers ate an average of a ton of milk, more than 5,000 pounds of concentrates, about 3½ tons of good hay, and were on pasture 223 days.

The low nutrition group received only 65 per cent as much nutrients as recommended. They ate less than 200 pounds of milk, less than ½ ton of concentrates, and about 3 tons of poor quality hay. They went on pasture earlier and got no supplemental feeding during 325 pasture days. *—University of Wisconsin*

He Fattens Steers On 'Homemade' Pellets



A low cost pelleting machine turns out up to 15 tons a day. "We didn't see any sense in hauling our feed to town and hauling it back," says this farmer . . .

Condensed from Capper's Farmer

George Beshore

WHEN M. L. Larson bought a pellet machine for less than $4,000 last winter, he and his two sons only planned to pellet grain and hay for their own stock. But instead they've gotten a paying custom business. All of Larson's neighbors want these "home-made" pellets, too!

"We didn't see any sense in hauling feed to town and then hauling pellets home," Larson explains. "so, we decided to make our own pellets."

Larson and his two sons, James and John, remodeled an old horse barn into a pelleting mill on their Laramie county, Wyoming, ranch. Soon their neighbors began chceking in.

In July and August alone the Larsons had to turn down orders for more than 1,000 tons of pellets. And they turned out 15 tons of pellets a day with only one man running the grinder, mixer, and pellet machine!

Experience justifies their neighbors' confidence in the pellets, too. One — W. B. King, also of Laramie County — put his steers on pellets made of half hay and half grain. They gained 2.8 pounds per day at a cost of 14½ cents per pound of gain on Larson's pellets.

King sold them in mid-August when they weighed 960 pounds — got 26 cents right at his ranch.

Larson is fattening both steers and sheep on pellets. So far he hasn't sold any of these. However, he has figures on 20 registered Angus bulls that got pellets during 65 days of a 140-day feeding test.

He had 40 bulls in the test when he finished installing his mill. So, he switched half of them to high-roughage pellets containing 60 percent hay, 35 percent grain, and 5 percent protein. The others stayed on the mixture of rolled barley and corn,

Reprinted by permission from Capper's Farmer, Topeka, Kansas

with silage and alfalfa hay, that all were getting.

Larson weighed the bulls daily and kept feed and gain records. Those on pellets averaged .2 pound more per day than the others at 4 cents less cost per pound of gain.

These results are similar to those at Illinois' Dixon Springs Experiment Station which you've read about previously. Those earlier reports built a bonfire of interest in pelleting. So let's take a closer look at the Larson setup.

Center of the operation is the pellet machine itself. It cost less than $4,000 and is powered by a 30-horse electric motor. It could be run with a 40- to 50-horsepower tractor or Diesel engine.

Larson is just half a mile from a 3-phase power line. So he paid part of the cost of bringing 3-phase electric power to the farm. He runs all machinery at the pellet mill with electric motors. All are the totally enclosed, explosion-proof type.

Ahead of the mill is a grinder, powered by a 40-horse electric motor, and a mixer. Larson grinds both hay and grain thru the same hammer mill and blows them into separate overhead bins. This lets him mix any proportion of hay and grain he needs for different kinds of pellets to start cattle out or finish them.

Larson charges $10 a ton for pelleting feed. The neighbor furnishes the ingredients, hauls them to the ranch, and picks up the pellets.

The mill makes about 4,000 pounds of pellets per hour if they contain as much as 30 percent grain with the hay — only 1,500 to 2,000 pounds when pelleting straight hay. They seldom make all-hay pellets, preferring to mix in some grain or molasses to lubricate the pellet mill die.

The manufacturer of the mill doesn't recommend it for making all-hay pellets. However, Larson has learned a few tricks by experimenting.

Acre for acre, the sea appears to be more productive of plant and animal life than land.

One way to increase capacity of the mill when running only hay thru it is to add water to the hay first. He dries the pellets in an ordinary crop dryer.

Another method they sometimes use is to include some wheat straw with the hay. It also lubricates the die and speeds pelleting of roughage without grain.

"You'd be surprised at what you can do with a fairly simple pellet mill," M. L. Larson remarks. "And the beauty of it is that you pellet any ration you need — right at home."

100 Pound Lambs In 100 Days

Read how it's done in this Montana flock.

Condensed from
Western Livestock Reporter

Jim Norland

PRODUCING 100 lb. lambs in 100 days is top efficiency. Such a goal is reached with regularity at Mt. Haggin Livestock Co., Anaconda, Mont., where the largest flock of registered Hampshires in the world — and perhap's the world's biggest Targhee flock as well — is handled with precision timing and care that minimizes lamb losses from conception to marketing day.

Some 6,000 breeding ewes are bred each fall at Mt. Haggin in a 90-day period that allows some 32 days for breeding each band of 1,450 ewes. The ewes are split up into 29 pens with about 50 to a pen. Each is paint-branded to identify the ram which is turned into each pen of ewes during the 32-day period.

The rams are turned into the pens each evening, then taken out the next morning, throughout the 32-day time. The breeding chores are handled at the Mule Ranch on summer range.

Crossbred Clean-Up

The clean-up of breeding operations comes after each band is turned out following the period with registered rams of the same breed. Here, the band is turned out on pasture with rams of the other breed (Hampshire ewes with Targhee rams, and Targhee ewes with Hampshire rams), resulting in some highly desirable crossbred lambs from ewes that would otherwise be carried through the winter as a liability instead of an asset.

Perhaps the most remarkable phase of Mt. Haggin's sheep-handling comes five months later, at lambing time.

A huge two-story lambing shed down in the valley not far from Warm Springs is the heart of this operation. Each band is driven to the shed as lambing time approaches, and into the upper story of this two-story structure, which coincides with the ground level of surrounding pasture.

After the ewes are brought in-

Reprinted by permission from Western Livestock Reporter, 1408 1st Ave. North, Billings, Montana

to either the day drop or night drop area, the system really begins to operate. Both of these drop areas, as in the rest of the lambing shed structure, are on the upper story of the two-story shed, and unique slatted floors keep the area dry and clean.

Self-Cleaning Floor

These floors are made of tapered two-by-four's laid in to correspondingly-tapered floor joists. Not a single nail holds in these two-by-four's which form the floor. The boards are widely separated at the bottom of the floor, with only a ⅝-inch spacing between them at the top surface of the floor.

Droppings land on the slatted floor and either go through directly to the bottom level of the lambing shed or else remain on the floor for a time until they dry and then are pounded down by new bands of sheep being turned into the lambing shed.

Because of the tapered boards, material that once starts through the opening between boards never sticks in the wider opening that is found at the floor bottom.

Droppings are relatively dry by the time they reach the bottom level of the two-story shed, and remain there for as much as three years before power equipment is driven in on the bottom level to remove and then distribute the manure over meadows and pastures on the sprawling Mt. Haggin properties.

Maximum Care — Minimum Work

Inside the lambing shed, under roof, temperature, humidity and freshness of circulating air is accurately controlled to assure a minimum of sick or dead lambs. The pens will hold 1,110 ewes with their lambs during their seven-day stay in the lambing shed.

Each pen has water available to its occupants, and feed is also handy via two-way or four-way bunkers which will accommodate ewes feeding from all sides. Water arrangements are such that the turn of a single valve can simultaneously water up to 40 pens at a time.

One silkworm will produce a thread of silk up to 3,600 feet long, and 1/1200 of an inch in diameter.

Lambs are dropped in the north end of the shed, and then are moved southward across an aisle into the next group of individual pens, where lambs are ear tagged and docked. This move leads them across a series of hot air ducts where the wet lambs are quickly dried off before further work with them.

Tagging, docking and registra-

tion information is quickly noted in the next group of pens. The sire and dam's registration numbers can be immediately ascertained by noting the ewe's ear tag and the paint-brand on her back identifying the sire. Crossbreds, of course, can be quickly noted as the produce of "mopping up" operations at breeding time.

After seven days in the lambing shed, the lambs and their mothers are moved outside again, this time into a canvas-covered shed where a gradual buildup of groups begins with 15 ewes and lambs, then groups of 45 pairs, and eventually into band-size groups.

Only the apple tree loaded with fruit has sticks and stones thrown at it — the barren tree is ignored. Do you suppose the same principle ever applies to humans???

The lambs are started on a special creep-feed formula when they are 10 days old, and kept on that ration until they are turned out on grass, usually about the 20th of May.

Crossbred Lambs Real Asset

The crossbred Hampshire-Targhee lambs turned out by Mt. Haggin, far from being a liability or inferior product as some might consider them, have become a substantial asset to the Mt. Haggin sheep production pattern.

Not only do they bring about a handy solution to identifying ewes and lambs which have not been bred to rams of their own breed, but they also mean a far smaller percentage of unproductive ewes.

"We get a crossbred with hybrid vigor," reports Dr. H. E. Furgeson, the veterinarian-turned-ranch-manager, who directs the entire Mt. Haggin operation," and the result is a lamb better in some qualities than either parent."

Demand for the crossbreds is good, Dr. Furgeson notes. "They're in big demand in the southeastern United States, and our production is sold before the ewes are bred. We've already sold all of them that we can possibly produce."

A guaranteed premium price is assured in this unique sales situation, too. The crossbred ewe lambs are sold at the high price of the Chicago fat lamb market on the second Tuesday of September each year, with delivery to southeastern U.S. buyers after that date. The crossbred wether lambs are shipped to Midwestern feedlots.

"Crossbreeding means we can use ewes not up to purebred sales standards, too, even though these ewes are still high quality and good for production of high-

quality lambs. Thus we can keep our purebred flocks at a high level of breed standards and not force dumping of poorer individuals on the open market."

Marketing sense has also made a big difference in Mt. Haggin's disposition of older ewes which are no longer suitable for breeding flocks in the Northwest. "We sell all our older ewes in the Midwest and Southeastern U.S.," adds Dr. Furgeson, "where they can be used because of the soft feed and milder climates, both conducive to more years of productivity."

Proof of Mt. Haggin's sound sheep management has come repeatedly, not only in high-dollar transactions like those mentioned above, but also in many shows of breeding stock and fleeces. At shows in which Mt. Haggin fleece entries have been made, the western Montana ranch has won more prizes than all other breeders combined.

Science Moves To The Hog Lot

Science in the hog lot is setting the stage for some revolutionary changes in production and marketing, says R. M. Godsey of Virginia Polytechnic Institute.

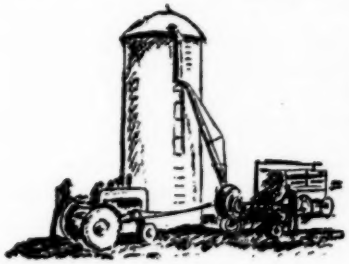
He backs up his contentions with some facts. For instance, Godsey says the 200-pound hog that needed 760 pounds of feed and a growing period of from 6 to 7 months in 1938 can be produced today in about 5 months with less than 700 pounds of feed.

In 1920-24 it took 5.1 pounds of feed to produce a pound of gain — as average for all hog producers in the United States. In 1950-54 this was reduced to 4.5 pounds, a 12 percent improvement. The advances since 1954 have been notable. It is now possible to make a pound of gain for 3.2 pounds of feed, and many top producers are doing this consistently.

Profits depend increasingly upon the producer's ability to keep up with research developments in breeding, nutrition, disease control, and in a dozen related fields, Godsey says.

—Virginia Agricultural Newsletter

How Does Corn Silage Measure Up?



Don't undersell the advantages of using corn silage in dairy rations . . .

Condensed from Successful Farming

C. F. Huffman and *Donald Hillman*
Michigan State University

WE'RE recognizing a big change in the value of good corn silage in a ration and in an over-all profitable farming operation.

New hybrid varieties, more plants per acre on good soils, and increased use of fertilizers have resulted in phenomenal increases in yields of silage per acre. Eighteen to 20 tons per acre is not at all uncommon in good corn-raising areas.

Then too, we're becoming more aware of the real value of grain in corn silage from a feeding standpoint. Also, the ease with which corn silage can be harvested and stored with little loss in nutrients or quality makes it compare very favorably with other kinds of roughages.

For years corn silage has been looked upon as a roughage, though it is really a mixture of roughage and concentrates. To get the most from corn silage, make allowance for the corn that's in it. In a dairy ration, grain feeding can be reduced 1 pound for each 10 pounds of good corn silage fed.

If a cow is eating 50 pounds of corn silage daily, then grain feeding is reduced 5 pounds daily. For cows producing 30 pounds or less of 3.5 to 4% milk, no grain is needed when 10 to 15 pounds of legume roughage is fed with a liberal amount of corn silage. Heifers over 4 months old will do well on just corn silage and hay. When they are big enough to eat 15 to 20 pounds of silage a day, no extra grain is needed.

The above feeding suggestions are based on good-quality silage — adjustments must be made if the silage is more immature. Comparisons of silage harvested in the early dent and in immature stages have been made. They were equal on a dry matter

Reprinted by permission from Successful Farming, Des Moines 3, Iowa

basis — therefore, it was necessary to feed almost twice as many pounds of the immature silage to get the same amount of dry matter into the cows.

Corn furnishes twice as much TDN (total digestible nutrients) per acre as clover-timothy hay and 30% more than alfalfa hay. Here's a comparison using generally recognized averages for the United States:

Average yields of nutrients from hay and corn silage

	Yield per acre, tons	Dry matter, lbs.	Dig. prot., lbs.	TDN, lbs.
Alfalfa hay	2.20	3,982	453	2,231
Clover and timothy hay	1.41	2,484	132	1,438
Corn for silage	8.00	4,416	192	2,928

The figure for corn silage is low considering yields of 18 to 20 tons of corn common in many good corn-raising areas. This comparison indicates how the use of corn silage can increase the size of the farm from a production point of view.

Corn silage is low in protein and high in TDN (total digestible nutrients). Hay and hay-crop silage from legume mixtures are good sources of protein but are of less value for productive energy on a dry basis.

When protein concentrates are high in price, heavy feeding of corn silage may not be advisable, but most often the gain in productive energy from corn silage is more than enough to take care of the additional expense of purchased protein concentrates.

The only practical method of using hay crops when they are equal to corn silage in productive energy on the dry basis is by good pasture. Even then it's necessary to keep the pasture grass young (pre-bud). Hay and hay-crop silage usually doesn't yield sufficient dry matter per acre to justify this practice. Then too, such crops are difficult to preserve.

Weather conditions do not usually interfere with ensiling corn. The quality of corn silage is generally superior to hay or hay-crop silage for the solid stems of the corn plant allow the ensilage to compact well, resulting in better keeping.

Tests have shown that the feeding value of the corn grain in corn silage has the same feeding value on a dry basis as the corn grain that has been harvested, stored, then ground and fed. Loss of nutrients in the corn

grain during fermentation is low since there is normally only 5 to 10% total loss of dry matter in corn silage during fermentation.

With the many factors favoring use of corn silage, it could play a key part in your dairy feeding program. Based on the results of a number of experiments at Michigan State University and other experiment stations, here are some ideas which will help you get top-quality silage when you harvest it next year.

USDA reports about 23 million acres of cropland have been taken out of production for periods of three to 10 years under conservation reserve contracts.

Tips on harvesting: Corn increases in nutrients per acre as it matures — the opposite of crops like alfalfa and timothy. Try to cut the crop when it makes the best feed, yet yields the most nutrients per acre. *The stalks and leaves should be green and corn kernels in the early dent stage.* This insures having silage containing about 70 to 72% moisture.

Grow a hybrid corn that does not mature too early or too late. New corn hybrids have been developed to fit a wide range of climatic conditions.

Although good silage can be made when the crop contains 80% moisture, the sacrifice of dry matter per acre is great. Some authorities say the yield of corn may increase about 40 bushels per acre during the 3 weeks prior to harvesting for silage at the recommended stage of maturity. This amounts to a gain of about 2 bushels of corn grain daily.

Fortunately, corn has a built-in preservative — a high sugar content. In case it is necessary to harvest earlier in the growing season because of early frost or poor growing conditions, good silage can be made.

Filling requires skill: Good silage making requires rapid filling regardless of the type of silo used. This fits in well with the use of field choppers.

Ordinarily the length of cut should be quite short — a cut of ¼" to ½" is highly desirable. In larger diameter silos or with greener material, a somewhat longer cut would be satisfactory.

Be sure to keep knives sharp so husks aren't allowed to go through whole and collect in pockets where mold will then grow. Tramping isn't needed in a tower silo, but even distribution is essential for making top silage.

What about storage? Most silage is stored in upright tower

silos and with the increased size of dairy herds, current trend is toward wider and taller silos.

In place of the traditional 10 to 14' diameter silos, those 18' to 24' in diameter are becoming more desirable. These provide more storage space at a lower initial cost per ton of storage.

For example, a 12'x40' silo has a capacity of about 90 tons and will cost about $20 per ton of storage or $1 per ton per year over a 20-year period. In contrast, a 20'x40' unit has a capacity of 250 tons and will cost about $7.50 per ton or 37 cents per ton per year over a 20-year period.

With these larger diameter silos, larger herds and higher levels of feeding, mechanical feeding is almost a necessity.

Walls of silos should be airtight to prevent spoilage. Surface spoilage in tower silos can usually be prevented by using a load or two of high-moisture roughage on the top.

Horizontal and stack silos should be filled rapidly and packed thoroughly. Each day's filling should result in at least 3' of packed silage. Exposed surfaces should be sealed as soon as filling is completed. Soil, sawdust, plastic covers, ground cobs can be used. Moisture proof plastic covers when used, should be carefully placed over the forage with the edges buried so air can't enter.

If no seal is used, the forage should be repacked with a tractor several times during the first week. This packing will mash the spoiled silage so it will form a seal and tend to keep out the air. Ground water should be diverted away from the silo by means of shallow ditches.

Control of Stored Grain Insects

Control of stored-grain insects with heat from radio-frequency electric fields is a future possibility described by a USDA engineer. Application of the method on a large scale will depend, he said, on further equipment development and experimentation. Advantages of fast kill of most stored grain insects is (within a few seconds) without damage to grain, and adaptability of method to continuous processing favor its development. By adapting components available on the market, Stuart O. Nelson of USDA's Agricultural Research Service stationed at Nebraska reported he and W. Keith Whitney of the Kansas Agricultural Experiment Station developed equipment that quickly killed all of several species of insects in stored wheat and wheat shorts. *—Grain Improvement Notes*

FUN ON THE FARM

A Collection of Jokes and Humorous Farm Stories

Unable to get experienced help, a farmer was forced to hire a man unfamiliar with farm chores. One day he found the hired hand forcing old Bossy to drink a pail of milk.

"Say, fellow," he said. "What's the idea of feeding that pail of milk to the cow?"

"Well," replied the new hand, "this darn cow stepped in it and got it dirty, so I'm running it through again."

—*The National Future Farmer*

★ ★ ★

In the old days, a brass band visited a small village. The people were delighted with it, but they couldn't understand the trombone and sent old Cyrus to investigate.

Old Cyrus watched the trombone player for some time. Then he said, with a sneer: "Take no notice of him, fellers. There's a trick to it; he don't swallow the durn thing."

—*Arkansas Valley Journal*

★ ★ ★

Some parents find it hard to handle some childen and the neighbors find it even harder not to.

It's difficult to save money when your neighbors keep buying things you can't afford.

★ ★ ★

Loss of a sale was a heart-rending calamity to the old general storekeeper, who was also the community's postmaster. He had no helper, and when he had to meet the mail train, he was tormented by thoughts of tourists stopping for gas, soft drinks, etc., and finding him gone.

Finally however he hit upon a comforting solution. He printed a sign in bold, red letters, which proclaimed during his absences: "Back in 15 minutes. Already been gone 10."

—*Texas Future Farmer*

★ ★ ★

Little Mary was on a visit to her grandparents, and the old-fashioned grandfather's clock in the hall was a source of wonderment to her. While she was standing before it, her grandmother said to her from the next room, "Is the clock running, dear?"

"No, Ma'am," Mary promptly replied. "It's just standing still and wagging its tail."

—*Midland Cooperator*

A dusty, shrewd-looking man descended from his wagon outside the farmer's house. "Fine piece of land out here!" he exclaimed.

"You're right, there," replied the farmer eagerly. "It's the best to be found in the county."

"Bit too high a figure for a poor man, I reckon?" asked the stranger.

"It's worth every penny of $500 an acre," answered the farmer with an eye to business. "You thinking of buying and settling in these parts?"

"Hardly," said the stranger, as he made some notes in a book. "I'm the new tax assessor."

—Mrs. Jane S. Howard, The Progressive Farmer

★ ★ ★

Two farmers from Alaska were constantly arguing over who grew the largest crops. One morning the first said to his son: "Jimmy, go over to Mr. Jones and borrow his crosscut saw. Tell him I want to cut a watermelon."

Jimmy was back in a hurry. "Can't have it today," he told his dad. "Mr. Jones says his wife isn't through slicing cucumbers."

—The Lion

★ ★ ★

It's remarkable that there is so much trouble left in the world when so many people are looking for it.

A Texan who got to brooding over the fact that he was living in only the second largest state, went up to Alaska and asked: "How do I get to be an Alaskan?" The bartender in the Last Chance Saloon, figuring on having a little fun with him, said: "Podnuh, you can't be a full-blooded Alaskan until you've downed a pint of whiskey at one gulp, made love to an Eskimo and shot a polar bear."

"That's for me," said the Texan planking down some money and ordering the nearest pint of whiskey. He got it down at one gulp although his eyes were glazing slightly as he lurched from the saloon. The boys waited for him until almost midnight, when he stumbled through the doors all scratched and ripped and bloody.

"Okay," he said, "okay, I'm gonna be an Alaskan. Now where's the Eskimo I'm supposed to shoot?"

—Wall Street Journal

★ ★ ★

A mountaineer, seeing his first motorcycle on the road, raised his rifle and shot away.

"Did you get that varmit?" his wife asked.

"Hit it, but didn't kill it," he said. "I can still hear it growlin' — but I shore made it turn that pore man loose!"

—National Grange Monthly

"Many a man thinks he's being cultivated when he is only being trimmed."

★ ★ ★

Remember "anger" is only one letter short of "danger."

★ ★ ★

"To what do you attribute your remarkable health?"

"Well," replied the old farmer, "I reckon I got a good start on most people by bein' born before germs was discovered, thereby havin' less to worry about."

—*The Farmer*

★ ★ ★

Experience is the difference between keeping your chin up and sticking it out.

★ ★ ★

The surest place to find a helping hand is at the end of your own arm.

★ ★ ★

We heard of a man who boasted that he never made the same mistake twice. He was always able to make new ones.

★ ★ ★

For many present day citizens, roughing it means turning the electric blanket down to "medium."

★ ★ ★

Conscience is the small inner voice that tells you the Internal Revenue Service might check your return.

A city slicker in a loud sport coat had just bought a horse from a farmer. "Tell me, son," said the farmer, "what are you going to do with that horse?"

"I'm gonna race him, pop."

"Hmmm," said the farmer. "You'll win."

—*Holstein-Friesian World*

★ ★ ★

"I see you're letting your son drive the car," observed the neighbor.

"Yes," the boy's father replied. "He's still too young to be treated as a pedestrian."

—*Iowa Farm Bureau Spokesman*

★ ★ ★

PORCINE PSYCHOLOGY

A pig's a stubborn critter.
He thinks his way's the best;
And when you try to drive him,
That's when you meet a test.
First grab a porker by the tail.
You use your head, you know,
And push in the direction
You DON'T want him to go.

—*John Goodwin, American Agriculturist*

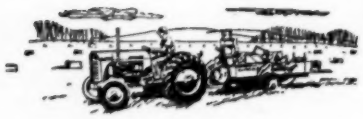
★ ★ ★

Stopping at a wayside service station in Arizona, the lady motorist inquired: "Do you have a rest room?"

"Nope," returned the attendant. "When any of us gets tired, we just sits on one of those oil drums."

—*Suffolk County Farm News*

What Does Your Machinery Really Cost?



Consider all these factors before you put more money into machinery . . .

Condensed from Wallaces Farmer

IT'S NO secret that the cost of farm machinery is large in proportion to farm income.

This fact emphasizes the importance of the correct decision on whether or not to buy a new machine. An unwise decision on two or three machines can easily reduce your net income.

So, before signing on the dotted line for that shiny new implement you are so tempted to buy, here are some of the items you will want to consider:

If a piece of farm machinery is to be a profitable investment, it must return more dollars to you during its useful life than the cost of owning it.

At the same time, you should figure whether some means of obtaining use of the machine other than by owning it might be more profitable.

Cost

Many folks think of cost only in terms of purchase price, or first cost. This is only one of many factors entering into cost. For some machines, it may be one of the less important factors.

Costs are made up of two general types — fixed and variable.

Fixed costs include such items as taxes, insurance, housing, interest on investment, and depreciation. These costs will have to be met regardless of how many hours per year the machine is used.

So the fixed cost per hour of use decreases as the number of hours of use increases.

Variable costs include such items as fuel lubricants, repairs and maintenance, and labor of operator. These items are generally in direct proportion to the number of hours of use.

Kindness is one language the dumb can speak and the deaf hear.

Returns

In determining possible returns

Reprinted by permission from Wallaces Farmer, 1912 Grand Avenue, Des Moines 5, Iowa

here are some of the items to consider:

1. How much labor will it save or replace? This will depend somewhat on the type of replacement involved. Replacing an old corn picker with a new one of the same size probably saves little labor. But trading a one-row picker for a two-row would reduce labor.

2. Will a new machine require purchase of other related equipment in order to utilize its full potential? For example, a mounted corn picker will not be used to its capacity unless you provide hauling and elevating facilities to crib the corn as fast as it is picked.

3. Will the new machine enable you to use existing equipment more efficiently? In the case of the corn picker and unloading facilities, the purchase of an elevator and provision for quick unloading wagons would be justified for the farmer who already had the corn picker.

4. What about potential savings in repairs and delays? Quite often, time is worth money. If you are struggling along with a patched-up, undependable piece of equipment, you may be paying for a new piece of equipment, whether you buy it or not.

5. Will the new machine increase your production, or the value of your product? A new tractor may allow you to handle more acres of cropland, or to farm existing acres more intensively.

6. How much total work is available? Here's where the fixed costs enter the picture. You have to use the machine enough hours or acres per year to permit it to save you enough money to offset the fixed costs.

When your troubles seem endless and you feel over-burdened — remember that a diamond was once just a piece of coal that has been hard-pressed for some time.

7. Finally, before investing in a new machine consider this angle carefully. Will the money bring the best return here or in some other phase of the farm operation?

If after considering costs and potential returns, you decide you cannot afford to buy the new machine in question, what are the alternatives?

1. Get along without the machine. This may be the least practical solution. It may mean that you will continue to operate with handicaps.

2. Buy it, and do some custom work. If there is a market in your area for the custom work

and if you have the time, this may be one possible solution.

3. Buy in partnership with a neighbor. This is another means of increasing the total available work for the machine. However, the problem of "getting along" with the neighbor should be fully considered before entering into this type arrangement.

One variation of this arrangement is for two neighbors to trade work, but each own his machine independently.

4. Have work done on custom basis. If you can hire a custom operator to do the job at the time you want it done, and have it done in a satisfactory manner, this is another possible solution.

5. Buy used equipment. If good quality second-hand equipment is available, many farmers find this to be a satisfactory solution. The important thing here is to be sure you're buying good equipment and not someone else's headaches.

6. Rent the equipment you need. In some areas, dealers keep machines which they rent to farmers. The cost may seem high, but close figuring will show when renting is your best alternative.

Your final decision should be based upon a careful consideration of all the factors. It all depends upon your own situation.

Dairy Heifers Make Efficient Gains on Corn Silage

Feeding trials at the University of Illinois show that dairy heifers make faster and more efficient gains on corn silage than on sorghum silage, according to K. E. Harshbarger, dairy scientist.

In a 24-week study, heifers fed corn silage made average daily gains of 1.65 pounds compared with 1.40 pounds for those on sorghum silage.

Although the sorghum-fed heifers ate 6½ more pounds of silage a day, total dry matter intake for the two forages was about equal — averaging 8.99 pounds a day for sorghum and 8.95 pounds for corn.

The heifers also made more efficient use of corn silage. On the average, the corn silage group consumed 6.42 pounds of dry matter for each pound of gain, and the sorghum silage group consumed 8.51 pounds. Grain consumption was the same for the two groups.

—University of Illinois

How To Use A Veterinary Thermometer

By The Editors of Farmer's Digest

A chapter from the new Veterinary Instruction Manual, recently published by Farmer's Digest. Complete contents of this new book to sell at $7.00 will appear in your regular issues of Farmer's Digest.

EVERY farmer should have a veterinary thermometer and know how to use it.

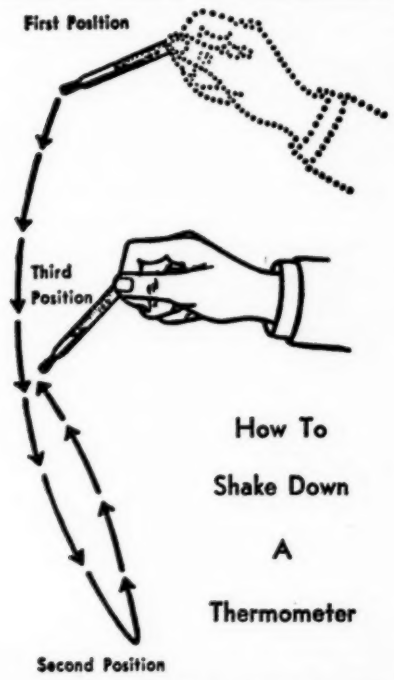
Taking the temperature of an animal and comparing it with the normal range for that type of livestock is a fairly simple thing to do if you follow these instructions. First, you should understand that a sustained, abnormal temperature is an indication of trouble and a warning for you to call your veterinarian.

Second, you should appreciate that a record of earlier temperatures may be an important guide to the veterinarian when he comes to diagnose and treat the trouble.

By taking daily temperatures when you suspect fever, preferably in the evening, you can detect infected animals much sooner than otherwise.

Daily temperatures are useful in both diagnosing a disease and in observing its course. With important diseases and especially with valuable animals, temperatures are often taken twice a day, preferably around 8 a.m. and 5 p.m.

Also for valuable animals, to determine average normal temperature, it may be desirable that a series of readings be taken at different times of the day during periods of good health. These readings will show individual variation from "Average Temperature" and also variation during different periods of a day.



How To Shake Down A Thermometer

Reprinted from The Livestock Veterinary Health Manual, published by Farmer's Digest Fort Atkinson, Wisconsin

This will serve as a guide during periods of illness.

Often the temperature at the time of examination is below normal, hence the true state of the sick animal is difficult to determine unless the veterinarian has previous temperature readings to rely on. It is not unusual for temperatures to be very high and drop to below normal afterwards.

These things may appear to be unimportant, but they can be very important to both the animal's owner and veterinary surgeon alike. Giving the veterinarian the benefit of your observations and any other particulars about the animal, will help him confirm what the expert himself notices and discovers by means of his instruments and tests. Farmers should observe their animals first and then ask for advice. Sound advice can only be given if the doctor is supplied with the necessary details.

Farmers should know that temperature alone cannot be the only diagnosis of disease or trouble. Temperature used along with an examination of the animal should be the rule to follow. Hot days, excessive exercise, or excitement will raise the temperatures of most animals.

When To Take Temperatures

If, for any reason, such as listless appearance, loss of appetite or drop in milk yield, an animal appears to be ill, it may be wise to check by taking its temperature.

If an animal has a deep cut which you have treated keep an eye on it for several days. Should its temperature rise, call your veterinarian at once.

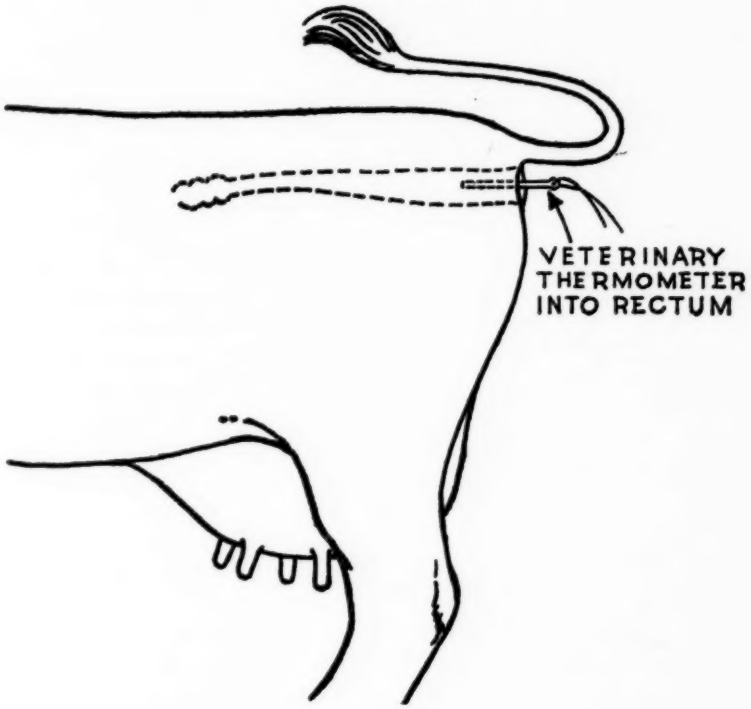
Do not accept as normal, any sudden drop in milk yield of a cow. There must be a reason and it should be found without delay. Unless the animal appears very ill, as much information as possible should be obtained before calling the vet.

How To Use The Veterinary Thermometer

Temperatures for livestock are always taken rectally, that is, the bulb of the thermometer is inserted carefully into the rectum of the animal. To perform this feat, it is best to restrain large animals by a halter or rope and to have smaller animals held by a helper. Very large animals which are dangerous normally or by the nature of the disease or trouble may have to be thrown.

After the animal has been restrained and calmed, the thermometer should be removed from its protective case.

For ease in handling your veterinary thermometer and to prevent dropping it accidentally during use, it is wise to thread a cord through the eye of your thermometer so as to form a



loop. (See illustration of thermometer).

Since your thermometer should always be stored in its protective plastic case, this string loop should be removed after each use so that the cover of the case can be replaced. Although this sounds like a chore, the few minutes of time spent in doing this may prevent your thermometer from being broken and out of use when you need it most.

At this time, before taking the temperature, be sure to shake the thermometer mercury down. Hold the upper end of the thermometer (the end opposite from the bulb) firmly between your thumb and forefinger. Now shake the thermometer vigorously, with a sharp, snapping motion. The purpose of this is to drive the mercury down at least as far as 95 to 97 degrees. If it doesn't go down, you aren't snapping it hard enough. Be careful to hold tight to the thermometer so as to not drop it. Until you get the hang of it, shake your thermometer over a pile of hay or straw. Then if it slips out of

your hand, it may not break. See illustration and instructions for shaking down a thermometer.

The mercury in a veterinary thermometer may split or separate into a broken column. This may happen during shipping to you. In some instances, the thermometer may have been shaken down incorrectly and the mercury separates from the bulb. To correct this, shake the thermometer down in the other direction so that the mercury column joins. Due to construction of the thermometer, the mercury column is hard to see from a point about ⅝" from the bulb. Chance that the mercury would be separated in this area and can not be shaken down is small.

Next, dip the bulb (the round ball-like end) of the thermometer into vaseline (petroleum jelly) or another clean non-chemically treated lubricant. This makes for easier insertion of the thermometer into the rectum.

Insert the thermometer, bulb first, gently into the rectum. There is no danger of breakage if normal care is taken. (See illustration).

Push the thermometer with a light touch, letting the thermometer find its own direction. If you hold it stiffly, it may poke inside and cause the animal pain. The bulb of the thermometer should be inserted deep into the rectum. (at least 2 to 3 inches leaving enough out for its recovery). The bulb is the only part of the thermometer which registers the temperature but be sure to insert far enough to record body temperature. Generally there is less chance for breakage if the thermometer is inserted well into the rectum than when it is only partly inserted.

Once the thermometer is in, hold it lightly in place because if the animal struggles, twisting may hurt it and cause you to break the glass of the instrument.

Most thermometers register fairly close within a minute in the rectum, but a period of three minutes is more accurate. Three minutes should be sufficient in all cases. This period should be actually timed and never guessed at. If you watch the thermometer sometime, you can see that it goes up rapidly at first. It gets within a degree of where it is going to stop in the first 20-25 seconds. After that it b a r e l y creeps up. If an animal is especially unruly, you can take the thermometer out in approximately a minute and have a rough idea of what the temperature is. However, it should be left in for three minutes if at all possible.

After the three minutes of time has lapsed, the thermometer is removed by one careful movement and wiped clean.

RECTAL TEMPERATURES

Kind of Livestock	Average Temperature	Normal Range of Temperature	Temperatures Which Indicate Illness	
			Under Normal Conditions	Under conditions of hot weather, excitement, extensive exercise
Dairy Cattle	101.5	100.4 - 102.8	103.0 and rising	104 and rising
Beef Cattle	101.0	98.0 - 102.4	103.5 and rising	104.5 and rising
Sheep	102.3	100.9 - 103.8	104.5 and rising	105.5 and rising
Swine	102.5	101.6 - 103.6	104.5 and rising	105.5 and rising
Horses	99.8	99.0 - 100.8	101.5 and rising	102.0 and rising
Dogs	101.5	100.5 - 102.5	103.0 and rising	104.0 and rising
Goats	102.0	100.6 - 102.0	103.0 and rising	104.0 and rising

Reading the thermometer is not really hard once you learn how. Most thermometers are engraved the same. They have a long mark for each degree and a short mark for each fifth of a degree. Only the even degrees (94, 96, 98, 100, 102, 104, etc.) are numbered on the thermometer, because of lack of space.

Most thermometers are somewhat triangular in shape, with one edge sharper than the rest. This sharp edge should point toward you. In this position the marks of the degrees are above and the numbers are below. Between them is the space where the mercury shows. Roll the thermometer very slightly until you see the band of mercury. Don't worry too much over the fractions of degrees. It makes little difference if the temperature is 100 4/5 or 100 3/5.

Normal And Abnormal Temperatures

The normal body temperature of animals varies much more than that of people. The normal range of body temperatures taken rectally and also abnormal temperatures for farm animals is shown in the table above in degrees Fahrenheit.

In using this chart remember that exceptionally hot days, excessive exercise, or excitement will raise the temperature above the normal range. However, if the temperature continues to rise and gets two degrees or more above the highest figures given in the normal range of temperature shown in the table, fever is present and your veterinarian should be consulted.

For example, if the temperature taken for a hog was 104.0 on a hot day there wouldn't be too much cause for alarm if other outward symptoms weren't present. However, if the temperature continued to rise to 104.5 or 105.0 there would be an indication that fever was present.

Remember that temperature is only one part of the diagnosis of a sick animal. In addition to pulse and respiration rate, observe and record other symptoms

(bloody urine, diarrhea, etc.) as well. Your veterinarian will want to know all this information.

How To Care For A Thermometer

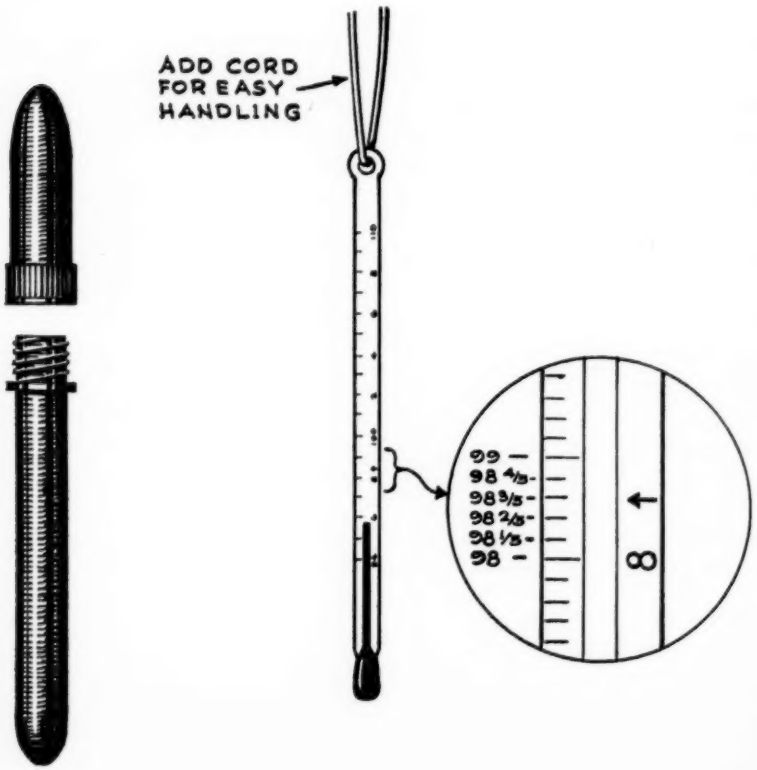
Wash thermometer with soap and cool water.

Do Not Wash In Hot Water.

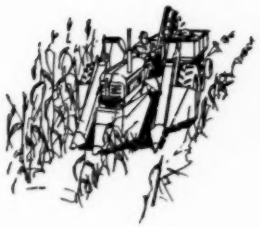
Do Not Place Near Artificial Heat Or In Sunshine as this may break the thermometer.

The thermometer should be immersed in a disinfectant solution before and after using. It should then be rinsed in cool water to remove any excess of the disinfectant solution.

Dropping or jarring a thermometer may affect its reliability, even though the glass does not appear to be broken. If the instrument has been dropped or jarred, it should be checked to determine whether or not the mercury, without being shaken down will retreat.



What Causes Corn Stalk Breakage?



Here's what you can do to solve this problem . . .

Condensed from Crops and Soils

C. E. Nelson, Washington State College

CORN stalk breakage has become a serious problem on irrigated soils, with as high as 60 percent of the crop damaged in some areas.

The downed corn resulting from breakage creates harvesting difficulties. Most of the downed corn plants, especially the ears, are too low for mechanical harvesters to pick-up.

Serious stalk breakage started about 8 years ago when farmers began seeding at higher rates and applying heavier treatments of nitrogen fertilizer. Experiments at the Irrigation Experiment Station at Prosser, Wash., indicate that these practices are responsible for the increased lodging. They cause greater height and weight of ears on the stalks, along with taller stalks. Corn borers and root rot do not cause lodging or breakage on these soils.

Increased rates of nitrogen, which cause the taller stalks, also increase the diameter of stalks and improve their resistance to breakage early in the season. But the heavier ears produced more than offset the added strength of thicker stalks, and cause more breakage as the stalks dry.

In the same experiments, stalk breakage increased with heavier nitrogen applications. But, breakage didn't increase beyond the point where maximum grain yield was reached. This was proven when yields and stalk breakage remained essentially the same on plots fertilized with 100, 200 and 400 pounds of nitrogen per acre.

Stalk breakage in the tests increased gradually as plant population was increased from 9 to 26 thousand plants per acre. On plots receiving no nitrogen, a maximum yield of 122 bushels per acre was obtained with 17,500 plants per acre. For plots fertilized with 100, 200 and 400 pounds per acre of nitrogen, a maximum

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yield of 154 bushels was obtained on all plots when a population of 20,000 plants per acre was used. Stalk breakage for these two population rates was 33 and 49 percent respectively.

In another experiment, corn plots irrigated up to October 30 showed less stalk breakage than plots irrigated only until August 20. Both treatments yielded 149 bushels per acre, with grain of 17.3 percent moisture content, when harvested on November 8. However, stalks from the late irrigated plots contained more moisture, and broke less readily with mechanical breaking tests.

Strength of stalks in the experiments was determined by four methods; (1) mechanical force necessary to bend a standing stalk to the breaking point; (2) the amount of force necessary to break the third internode of the stalk between two supports 6 inches apart; (3) the diameter of the third internode, and (4) the ear weight and height (above ground). The first three measurements were made early in the fall at a predetermined stalk moisture content. All of the measurements indicated the same degree of stalk breakage which would result from fall storms.

As a result of the experiments, the researchers recommended the following practices for reducing stalk breakage.

(1) Plant corn at a rate which gives no more than 20,000 plants per acre;

(2) Irrigate corn fields until late in the fall (about October 30);

(3) Harvest as early as possible;

(4) Select hybrids in the recommended maturity range, which produce ears low on the stalks without sacrificing yield.

These corn production methods should help to reduce cornstalk breakage and resulting crop losses on irrigated soils.

Population Boom

The U. S. population is skyrocketing. Increasing at the rate of 3 million annually, the number of people, according to recent predictions, will double in the next 40 years — reaching 260 million in 1980 and 350 million by the year 2000. To cope with such a "boom", farsighted planning will be needed in housing, agriculture, production of consumer goods, schools and colleges, and many other fields.

—Senator Wiley's Newsletter

Feeding and Managing the Brood Sow and Litter

Here's a feeding and management guide . . .

Condensed from
The American Hampshire Herdsman

C. E. Barnhart, University of Kentucky

FEEDING and managing the brood sow and litter is an important item in swine efficiency.

Two or 3 days prior to farrowing, the sow should be in her farrowing quarters and placed on a bulky-laxative type of feed, such as equal parts of bran and ground oats. One to 2 pounds of this ration will be sufficient until the sow farrows. As a generale rule, sows do not need any feed the first day following farrowing; however, some sows are restless and uncomfortable, and these should be fed lightly. The same mixture of bran and ground oats may be fed for 2 or 3 days after farrowing. Then, the regular lactation ration may be gradually substituted for the bran and oats so that the sow is eating all she wants by the time her pigs are 10 days old. Sows nursing 6 or more pigs should be self-fed. It is not profitable to self-feed sows with litters of less than 6 pigs. Heavy milking sows with large litters commonly become very thin and come down with posterior paralysis. This condition may usually be prevented by feeding adequately balanced rations. In the event a sow does suckle down too thin, the pigs should be weaned. A satisfactory lactation ration that may be either self-fed or hand-fed is given in Table 1.

Table 1

Lactation Feeding Formula

Ingredients	Pounds
Ground yellow corn	60.00
Ground oats	20.00
17% Dehydrated alfalfa meal	5.00
44% Solvent oilmeal	8.00
50% Meat and bone scraps	5.00
Ground limestone	1.00
Steamed bonemeal	0.50
Iodized salt	0.50
Vitamin A and D^2 premix*	.....

Reprinted by permission from The American Hampshire Herdsman, N. Main St., Pontiac, Illinois

B-complex vitamin premix*	.....
Vitamin B^{12} antibiotic premix*	.....
Total pounds	100.00

*These three premixes shown in table 1 may be purchased from feed mixers and livestock supply stores. Add enough of the Vitamin A and D^2 premix to provide 200,000 I.U. of Vitamin A and 4000 I.U. of Vitamin D2 for each 100 pounds of the ration. Add enough of the B complex-vitamin premix to provide 100 milligrams of riboflavin, 200 milligrams of calcium pantothenate and 400 milligrams of niacin per 100 pounds of feed. The Vitamin B^{12} and antibiotic premix (premixes) should be added to provide 1000 micrograms of Vitamin B^{12} and 1000 milligrams of the antibiotic per 100 pounds of feed.

Bingham, Utah, is 5 miles long and 1 street wide.

The following management procedures should be practiced during the nursing period.

Farrowing — Scrub farrowing house with boiling water and lye (20 gallons water to 1 pound lye). The use of a steam cleaner is preferred. It can sometimes be rented from a nearby garage. Wash sows thoroughly with soap and water before placing them in clean farrowing pens.

Navel Cords—Dip young pigs' navel cords in iodine, then tie them in a knot close to the body and clip off below the knot.

Needle Teeth — Clip pigs' needle teeth with a pair of small side cutting pliers at birth. This will prevent the pigs injuring themselves and their dams' udders.

Ear Notch — Notch pigs' ears at birth for identification. Identification is especially helpful in culling sows and picking replacement gilts in commercial herds. It is a must for recording in purebred herds.

Weak Pigs — Inject 2 cc of glucose in each ham or fore flank for 2-3 days.

Milk Fever — Good milking sows sometimes have milk fever when pigs are a few days of age. They lie on their bellies and refuse to let the pigs nurse. In such case, the pigs should be removed and fed by hand. Keep cold packs on the sows' udders and in advanced cases consult a veterinarian for calcium gluconate treatment.

No Milk — Sometimes sows will not start milking following farrowing. Two cc of diethylstilbestrol on alternate days for 3 days is usually successful in starting the milk flow. A 2 cc injection of pitocin will also usually start milk flow.

Mastitis — Sows frequently have mastitis and can be successfully treated by injecting 5 cc of combiotic into the ham each day for 2-3 days.

Scours—Baby pigs very often scour sometimes during the first few weeks after farrowing. Two cc of combiotic injected in the ham for 3 successive days is an effective treatment.

Anemia — If pigs do not have contact with the ground by the time they are 1 week old they may become anemic. To prevent anemia, either swab sows' udders with a solution of 1 pound of iron sulfate (Copperas) dissolved in 1 quart of water or give the pigs a pill containing 3-5 grains of iron once a week until the pigs are eating feed or are on the ground. A 2 cc injection of iron dextrin on the 4th or 5th day after farrowing and at 2-3 weeks of age is also successful.

Castrate—In commercial herds castrate all males at 2 to 4 weeks of age. In purebred herds castrate at this same age all offbelt and other males that you know at that time that you should not keep because of not enough teats, poor litter size or other factors. Castrate other males as soon as you can tell whether they are worthy of keeping for breeding purposes.

Hog Cholera — Vaccinate pigs for hog cholera when they are approximately 6 weeks old. One of the attenuated viruses on the market may be used. If pigs are weaned when 3 weeks old it is advisable to treat them with hog cholera serum for immediate protection.

Wean — The conventional age to wean is at 8 weeks. Some producers may wish to wean at 3, 5 or 6 weeks. This can be done successfully if good equipment is available, a pig starter is fed, and careful management practiced.

Erysipelas — Vaccinate with one of the bacterins at 7-8 weeks. Follow with a second shot at 2-4 weeks later. Give the breeding herd a booster shot every 6 months.

Worm — Pigs should be wormed shortly after weaning. The most efficient and widely used wormer is technical grade sodium fluoride. Mix 1 pound of sodium fluoride with each 99 pounds of dry complete mixed feed (a mixture pigs are accustomed to eating) and self-feed for 24 hours. Do not feed this mixture as a slop. Sodium fluoride is highly poisonous; therefore, handle it carefully.

Farrowing on clean ground or hauling pigs from the farrowing quarters to clean ground will help to control roundworms.

External Parasites — Spray the breeding herd and pigs with a 0.25 per cent solution of either chlordane or benzene hexachloride at intervals of every 2 or 3 months to prevent mange and control lice. More frequent treatment may be necessary in some cases.

Pigs may be weaned when 3 to 5 weeks old, instead of the conventional 8 weeks, if good equipment is available. Pigs weaned early must be kept in a warm well ventilated barn. For best results divide pigs according to size and keep no more than 10-15 pigs in one group. Allow 6 square feet of floor space per pig. A highly nutritious pig starter and water should be available at all times. A good pig starter formula is given in Table No. 2.

Table 2
Pig Starter Formula

Ingredient	Pounds
Ground yellow corn	16.30
Rolled oats (table grade)	20.00
Sugar (cane or beet)	15.00
44% solvent soybean oilmeal	20.00
Dried skimmilk	20.00
60% Fish Meal	2.50
Dried corn distillers solubles	2.50
Steamed bone meal	2.00
Ground limestone	1.00
Iodized salt	0.50
Trace mineral mixture	0.20
Vitamin A and D^2 premix	.....
Vitamin B-complex premix*	.....
Vitamin B^{12} antibiotic premix*	.....
Total pounds	100.00

*These three premixes as listed in table 2 may be purchased from feed mixers and livestock supply houses. Add enough of the Vitamin A and D^2 premix to provide 500,000 I.U of Vitamin A and 62,500 I.U. of Vitamin D^2 for each 100 pounds of the ration. Add enough of the B complex vitamin premix to provide 500 milligrams of riboflavin, 1000 milligrams of calcium pantothenate, 2400 milligrams of niacin and 2500 milligrams of choline chloride per 100 pounds of the ration. The Vitamin B^{12} and antibiotic premix (premixes) should be added to provide 1000 micrograms of Vitamin B^{12} and 1000 to 2500 milligrams of antibiotic per 100 pounds of feed.

The nation's farmers now own liquid financial assets of about $14.5 billion, which includes not only cash but other assets they can turn into cash on short notice. More than $5 billion, or roughly 35 per cent of these liquid reserves, are in U. S. Savings Bonds.

Cull Now Or Pay Later

The cattleman who culls his poor producers now will stay in business when the cycle changes from a "seller's" to a "buyers" market . . .

Condensed from National Livestock Producer

Reuben Albaugh, University of California

USDA'S tally book may record 102 million head of cattle as of January 1, 1960. That's the largest number of bovine animals ever recorded in U. S. history.

If the present build-up in beef herds continues, and with moisture and grass permitting, we might be producing 110 million head of cattle by January 1, 1962 — just two short years away.

Since increased numbers and increased slaughtering go hand-in-hand, per capita beef consumption may hit 90 pounds in 1960 and bounce up to 100 pounds in 1961.

The question arises, at what prices will such quantities of beef sell? Even with peak employment and high purchasing power the price of live cattle is bound to suffer.

At the start of 1959, we had 64 million head of beef cattle — the highest number of record. Of this number, 25.6 million were cows and heifers two years or older. With the exception of 1955 this is most breeding beef cows ever recorded. Heifers in the one to two-year-old class totaled 6.8 million head — another record. Calves on hand totaled 19.8 million, likewise a record.

In view of these data on inventories which indicate increasing slaughter rates, what can the cowman do to cope with rising cattle numbers?

In one word, the answer is Cull.

Progressive cattlemen cull their herds every year, regardless of economic trends, prices, or cattle numbers. Every herd of cattle has poor producers. Therefore, a systematic culling program would be a most timely and profitable practice for most cattle producers. Consider these culling practices:

Reprinted by permission from National Livestock Producer, 139 North Clark St., Chicago 2, Illinois

Cull Diseased Animals

There are many diseases that affect cattle production. Unthrifty or diseased animals that are not efficient users of feed are usually poor producers and should be culled, especially during times of high cattle numbers. Cancer eye is one malady that frequently affects from 4 to 5% of the herd. Sell such animals before they become so badly infected that they can't be sold for slaughter. Lumpy jaw is another disease that should be caught in early stages. Look for symptoms of abortion-causing diseases such as leptospirosis, brucellosis, etc.

Crippled Animals

Cattle that are hip shot, have deformed feet, enlarged hocks, or other deformities should hit the butcher's block.

Poor Udders

Cows with spoiled udders, enlarged teats, and those with a tendency to have uterine prolapse are good kinds to cull.

Old Cows

Old cows of 9 to 10 years of age produce smaller calves than cows of 4 to 8 years of age. Older cows also produce calves that are 30 to 50 pounds lighter at weaning age than those produced by younger cows. A 10-year study in New Mexico indicates that cows producing heavier calves at three years of age will continue to produce calves of above average weaning weights until they are nine years old. Old cows that are borderline producers should go the culling route.

Small Cows

An 8-year study shows that large cows produce larger calves at weaning time than do small cows. The large cows weaned 94 of their calves compared with 82 calves weaned by the pony-sized cows. On a lifetime average, that amounts to 1.5 more calves per cow for the entire breeding herd.

U. S. CATTLE NUMBERS

(In Thousands)

	Value Per Head	Total All Cattle	Total Beef Cattle
1942	$ 55.00	76,205	37,188
1943	69.30	81,204	40,964
1944	68.40	85,334	44,077
1945	66.90	85,573	44,724
1946	76.20	82,235	43,686
1947	97.50	80,554	42,871
1948	117.00	77,171	41,002
1949	135.00	76,830	41,560
1950	124.00	77,963	42,508
1951	160.00	82,083	46,685
1952	179.00	88,072	52,837
1953	128.00	94,241	58,320
1954	92.00	95,679	59,518
1955	88.20	96,592	61,231
1956	88.00	96,804	62,067
1957	91.60	94,502	60,232
1958	119.00	93,350	59,937
1959	153.00	96,851	64,025

The weight of calves from large cows was 100 pounds heavier than for small cows. The big-cow calves had higher rates of gain. Since the costs of raising cattle is figured by the head, you don't have to be very smart to figure out that "Shetland Pony" cattle should be culled when

numbers soar toward the 100 million mark.

Shy Breeders

In every herd there are a few cows that are shy-breeders. These bovine queens who "want to be alone" may look good to you because they undergo the rigors of producing a calf only every other year. They reduce calf crop percentages and increase the red ink on the ledger. Put the CULL brand on 'em.

Non-Pregnant Cows

Testing each cow about 60 days after the breeding season starts is another profitable practice. Well trained veterinarians can determine pregnancy very accurately by this time. Unless they are unusual individuals, these non-pregnant cows should be culled. The feed they consume can be fed more profitable to pregnant cows or younger, growing animals.

Caterpillars chew by moving their jaws sideways — opposite from humans.

Poor Producers

Locating the poor producer, the cow that produces an unthrifty calf, is a difficult assignment, but it can be done. At weaning time the unthrifty, small, coarse, rough, horsy calves are sorted from the herd. After a short separation, these calves will "mother up" and you can use the calf to cull the mother. Such cows and their off-spring could be culled and sold in pairs.

Replacement Heifers

Do a scientific job of selecting replacement heifers. All heifers should be identified and weighed individually at weaning time. Between weaning and 15 months of age they should be fed a continuous growth ration, one that will enable them to gain about a pound a day. At 15 months, weigh each heifer individually and g r a d e her performance. Those that grade 2 minus or better (University of California grade) are kept for replacements. Where this system is followed rigidly, quality and grade of all animals in the herd and their gaining ability is enhanced.

During the past couple of years, the cattle business has been operating in a "seller's market." Rising prices have taken care of many production and management mistakes. When the economic cycle changes to a "buyer's market" (about 1960-61) the inefficient operator will be the first to go when the men are separated from the boys. In such p e r i o d s, cow-savvy and shrewdness must be coupled with sound, practical scientific beef production practices.

In addition to culling, there are a number of management

practices which cattlemen should consider in handling their herds during the next few years. We have analyzed four possible methods of operation to determine profit possibilities.

Dr. Herrell DeGraff in analyzing "Adjustments to the Cattle Cycle" for American National Cattlemen's Assn. studied only the price side of the picture. We have added feed costs as an additional variable which must be considered in arriving at an acceptable decision.

The four possible methods of operation which we have analyzed include the following:

1. Uniform Culling: Continue with a normal culling and sales program.

2. Double Culling; Double Holding-Back: Double the normal culling of cows during the next two years, but don't sell any cows the third year. Hold back sufficient heifers during the second year so that cattle numbers and sales are back to normal in five years.

3. Double Culling; No Holdback: Double the normal culling of cows and sell all heifers in the first and second years. Hold all heifer calves starting the third year until normal numbers and sales can be rebuilt in the eighth year.

4. Culling 50% of Cow Herd: Cull 50% of the cows in each of the first and second years and sell all calves during these years. Purchase breeding cows in years three-through-five until a normal operation is resumed.

Assumptions underlying this study presume price levels and relationships similar to those experiences during the last cattle cycle (1951 to 1958) with prices based upon Utility grade slaughter cows at Chicago; Good to Choice feeder calves at Kansas City. In 1951, for example, cull cows averaged $24.50 per 1,000 lbs.; 425 lb. steer calves $37.70; 400 lb. heifer calves $36.10. In 1958, these prices were: Cull cows $18.50; steer calves $31.75 and heifer calves $29.50.

Two-year-old heifers, depending on their exact age, will produce between 70 and 80 per cent as much milk and fat as they will at maturity.

We also assumed a normal operation from year to year with no allowance for changing feed conditions, unusual weather, or special disease problems. We considered the possibility of marketing ranch produced feed not used as a result of decreased cattle numbers. Feed costs calculated at $40 per animal unit were based roughly on the following: Summer range 5 animal unit months

at $3.50 or a total of $17.50; fall range, one animal unit $3; hay .5 ton at $20 a ton or $10; and winter range 4.3 animal unit months at $2.50 or $10.75. The total comes to $41.25.

Feed costs in mountain areas run about $10 per year less, whereas considerable use of irrigated pasture would add about $10 more to this unit feed cost.

Using the preceding prices, the analysis of a 100 cow breeding herd, with normal 20% culling of breeding cows annually, selling steer calves at 425 pounds and heifers at 400 pounds, gives the following results for eight years covering the downswing and subsequent upturn of the cattle cycle for the four methods of management previously described. The following are eight year totals:

1. Uniform Culling: Gross sales of $78,352; feed costs $40,000. No cows bought. Net sales above feed cost $38,352. No feed sold. Cattle and feed sales above feed costs $38,352.

2. Double Culling; Double Hold-back: Gross sales $77,045; feed costs $38,600. No cows bought. Net sales above feed costs $38,445. Feed sold $1,400. Cattle and feed sales net $39,845.

3. Double Culling; No Hold-back: Gross sales $73,646; feed cost $32,550. No cows bought. Net sales above feed costs $41,096. Feed sold $7,600. Cattle and feed sales net $48,696.

4. Cull 50%: Gross sales $90,867; feed costs $36,800. Cows bought $12,270. Net sales above feed costs $41,797. Feed sold $3,200. Cattle and feed sales net $44,997.

The results show definite profit advantage in heavy culling during periods of high prices, but whether to cull or replace with raised heifers or to buy replacement cows depends on whether or not the unused feed can be sold. If the herd can be reduced and the unused feed sold, it is more profitable to cull heavily and then replace the herd with raised heifers.

If the unused feed can't be sold, you reduce your purchases of feed as a result of the cut-back in herd size; then selling and buying back replacement cows at a lower price is more profitable.

The effect of income tax on these various methods of operation has not been estimated because it will affect individual ranchers differently.

It is hoped that the above suggestions will stimulate sound and constructive thinking on the part of cattlemen who must use every method in the book to cope with the ever changing cattle cycle.

The Big Farm

Is it a stepping stone or a treadmill? Let's put the emphasis on production costs, not on size alone . . .

Condensed from American Agriculturist

Hugh Cosline

TO hear and read what some folks are saying, you could easily conclude that the only road to a better farm income is to rush out and buy more cows and more land! I don't believe it.

The inference is that a bigger farm operation will cut production costs. In some cases it will — but not always. So why not put the emphasis on cutting production costs per hundredweight of milk, per dozen of eggs, or per bushel of apples or potatoes regardless of how it is done? Then the fact that a bigger operation may in some cases cut costs can be put in its proper place without overlooking other ways of getting the right result.

Incidentally, it would be interesting to know what size farms go broke. I suspect that as many big ones as small ones end the year in red ink! The farm that hires no labor, but depends on family help, is rough competition for the one that does.

In any discussion of size, we need to define what we mean by "big" and what we mean by "the family farm."

While I am unenthusiastic about "bigness", I know that the average size of farms has increased, and will continue to increase. Mechanization makes it possible for a man and his family to handle more acres and more animals. I make no defense for a farm so small that the gross income is smaller than the net should be. If after careful thought, a man decides to increase the size of his business, I certainly would not argue against his decision. Neither will I argue with the man who decides to stay and improve his small farm.

I have visited many farms, large enough to keep one man busy and still return a good income. I find these men and their families contented and prosperous. As one man said, "Why

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should I buy more cows or more land? I'm doing all right now."

We will always have some corporation farms, but I don't look for them to multiply rapidly, mainly because a good-sized family farm has much in its favor. The question then is, how big should a prosperous family farm be?

You cannot set the figure in acres. You can be sure, I think, that the kind of farm big enough to keep the members of the family profitably employed will continue to dominate the American farm scene. Assuming that we can keep relatively free of red tape and regulation, the family can reach management decisions quickly, and put them into operation immediately. The labor force is flexible. In an emergency, long hours can be worked, and the entire family can pitch in and, as Dr. George Warren once said, can multiply the amount accomplished by at least four times a normal day's work for one man.

So, let's take a look at some ways of cutting costs on a dairy farm without buying more land or more cows:

1. Use More Lime.

One reason for buying more land is to grow roughage or grain for a bigger herd. We know that most farms need more lime than is being spread, *and that you do not get full results from fertilizer on land that needs lime.* Before you buy more land, you might decide to buy enough lime to meet the full needs of your soil. That might result in enough hay so you wouldn't need more land.

2. Get More Milk Per Cow.

There are many ways to do this, the quickest being to feed them better. Close figuring proves the possibility of a ton more milk per cow per year from a high quality roughage program. Such roughage carries a high per cent of digestible nutrients, and cows will eat more of it. Incidentally, the bigger your acreage, the more trouble you are likely to have in getting grass into the silo, and hay into the mow, early and in top condition.

Be slow in choosing a friend, slower in changing one.

Another fast way to boost production is to buy a few topnotch foundation cows. A slower way, but a good one, is to practice artificial breeding to good bulls.

3. Raise More Grain For Cow Feed.

This suggestion, I am sure, will not fit all farmers, but it will fit some. There are many cases where raising more grain and feeding it to good cows will give a better net return, even it it means keeping a few less cows!

4. Do Work on Time.

A few days' delay in sowing oats reduces yield. Weeds are killed easiest when they are young. The best time to repair equipment is before it is needed in the field.

You may disagree, but it seems to me that in getting work done on time the one or two-man farm has a big advantage over one that is larger.

5. Hire Custom Work Done (or do it)

One of the arguments for increasing acreage is the need for mechanization, followed by the need for enough land to keep the equipment profitably employed.

One way to solve the problem is to hire some equipment work. The objection I commonly hear is that the equipment can't be hired when it's needed. Nevertheless, if a piece of equipment must be used a certain number of hours to make it pay, it follows that every acre, even on the owner's farm, cannot be covered at the best possible time.

Another way to meet the situation is to buy the equipment and do some work with it on neighboring farms for pay. Take wheat as an example. With a fairly constant number of acres in a neighborhood, there is work for one or more combines. Some thought may result in a decision as to who should own it, you or them. Surely the way to harvest grain is with a combine; surely it is poor management to have twice as many combines in a neighborhood as are necessary to do the job!

There are other ways of increasing the farm income, some of which fit other types better than dairy farms. One way which has been adopted by many is for some member of the family to get a part-time or full-time job off the farm.

Another way that works on some farms is to sell at retail, thus getting 100% of the consumer's dollar. In some cases, a roadside stand or a route in a nearby village or city gives profitable work without adding acres or animals.

A variation is to grow a special quality product at a premium price, for example seed grain instead of feed grain. In other cases, an enterprise can be added that requires a minimum of land, for example, hens.

To conclude, let me repeat that I am arguing neither for smallness nor bigness. If a farmer has all the facts, I believe he will reach the right conclusion. What I am saying is this: Let's put the emphasis on lowering production costs per unit, realizing that sometimes a bigger business is one way — but not the only way — to cut these costs.

Start Your Son As A Partner

It's the best way to keep him on the family farm, but be sure he really wants to be a farmer . . .

Condensed from Guernsey Breeders' Journal

DOES your son want to be a farmer?

For many farm boys, their only way to start farming is to go into partnership with their fathers. If you and your son are thinking about a partnership, better ask yourselves a number of questions first.

Does your son really want to be a farmer? Starting in farming today is not easy. A young man must be willing to work hard and to sacrifice. He must really want to be a farmer.

Must Have Harmony

Does your son want to farm with you? Father and son will have to be able to get along if the partnership is to be successful. It may help if both realize that they would have tough going without each other. The son needs his father's capital and the father needs his son's youthfulness and ability to work. If the two can't work together, the son will be ahead to try to farm under some other arrangement or seek employment off the farm.

Will your farm provide enough income for two families? A small farm will have to be highly intensified with high-income, high-labor requirement crops or livestock. Study your farm income records for the past few years and figure possible ways for extra income.

What makes a good father-son agreement? An ideal plan allows the son to accumulate ownership of livestock, machinery and land as he acquires experience. Otherwise he will be working for wages and not really getting started farming.

Any gifts to the son should be avoided. Although a gift of a tractor or a few acres may seem desirable, both father and son will better be able to keep their

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self-respect, and the son will have more pride in what he owns if the partnership is always on a business basis.

Livestock, machinery, and other capital investments should be put in the son's name as soon as he becomes the owner. This will keep him from paying for anything twice in the event of dad's death. For example, if the son owns a tractor, but if the partnership neglected to transfer the tractor to his name in writing, he might have to buy the tractor at an auction settling the father's estate.

As the son's share of ownership grows, the father should be able to retire from some of the heavy farm work, without separating himself entirely from the operation of the farm. Definite plans should be made for the time when he will leave his son entirely on his own.

Actual agreements vary. Each partnership will have to decide what plan will work best for them. One young farmer receives 25 per cent of the profits at the end of the year, plus a house for his family. His dad pays all the real estate and personal property taxes from his share of the profits.

When the son has an investment in the farm, the partnership might split income in proportion to contributions of labor and capital. To illustrate, suppose dad owns $50,000 worth of land, machinery, livestock, feed supplies, while the son owns $5,000 worth of these items. At a five per cent rate, the interest on the father's investment will be $2,500, on the son's, $250.

The Son's Share

Suppose the son will do 12 months work, the father eight, and labor is valued at $125 a month. Then the son's total contribution to the farm business will be $250 plus $1,500, or $1,750, and dad's will be $2,500 plus $1,000 or $3,500. The son will share a third of the profit.

This plan is recommended when the father is some years away from retirement. It will also work when there is more than one son.

If the earth were perfectly round, water would cover it about 9,000 feet deep.

Another plan splits returns to labor in proportion to labor contribution after interest on all capital invested is paid. As in the last example, the son would be allowed $250 and father $2,500 for capital. The difference between total farm profit and $2,750 would be split according to the amount of work done by each. Since the son worked 12 months and the father eight, the son would receive 60 per cent of

the difference.

The son would get a break under this arrangement. It's best used when the father is nearing retirement.

Still another possibility is starting with an agreement to divide the profit equally after paying the contributions of both labor and capital. In the examples above, the son would be allowed the $1,750, and dad, the $3,500; the difference between $5,250 and the total farm profit would be split equally.

If the son is to be on a trial basis at the beginning, then regular wages plus a bonus or a share of profits might be the best arrangement for a while. Under a typical agreement, the son might be paid $125 per month, plus board, and at the end of the year receive 15 per cent of the profits of the farm business. This might work when more than one son is involved.

There are many other possible arrangements. Any landlord-tenant agreement common in your community can also be used.

Tips for Fathers and Sons

Here are some tips for fathers and sons going into business together:

1. Have a mutual agreement before starting any partnership. Failure to plan a definite father-son arrangement can bring confusion and misunderstanding to both. One young farm boy, just out of high school, started farming with his dad before planning how the farm income would be split. The son was given only enough money to meet current living expenses. Eight years later, disillusioned and much wiser, the son left the farm. During those years, no records were kept, no cash settlements made. The son had actually been working for wages set by his father, since he left the farm with no ownership.

Avoid Misunderstanding

2. Regardless of the kind of agreement, it should always be in writing to avoid misunderstanding. Writing an agreement doesn't mean that you don't trust each other, but in case of disagreement, each party can be held to his responsibilities. Neither party should forget the terms, since both will have a copy. Just drawing up a contract or other written agreement will make you realize that you are in business, that you have definite obligations and a definite source of income.

3. The son should expect to work harder and longer. He might also keep all the records, including farm cash accounts and farm inventories.

4. Settlements should be made yearly or oftener. Knowing where you stand plays an important role in your farm success.

Systemics For Plants And Animals

The interesting facts on one of agriculture's newest weapons . . .

Condensed from The Young Farmer

L. K. Cutkomp, Department of Entomology and Economic Zoology, University of Minnesota

THE startling statement, "Plant kills insect," has taken on new significance today.

Researchers have given it importance by showing that certain pesticides called "systemics" can be absorbed by a plant which can then become toxic to insects or mites. Actually, the use of a "systemic" pesticide has been extended much further. We also have animal systemics as well as plant systemics. Animal systemics control parasites of cattle, sheep and other domestic animals.

Systemic insecticides are becoming an important phase of useful pesticides in agricultural production. The need for improved quality and increased quantity of many agricultural products has become very important. Although resistant varieties and the use of parasites and predators is helpful in reducing pest insects, the increased use of pesticides continues to go forward. One of the newer uses includes this development of systemically active pesticides.

Systemic pesticides are capable of getting into and moving about in the plant or animal system. This is primarily accomplished in the sap stream of plants and in the circulating blood of animals. Many pesticides are not capable of getting into the plant in effective quantities and therefore are non-systemic.

Actually, one cannot predict positively whether a new compound can become a plant systemic or not. In contrast, most insecticides can get into the blood stream of warm-blooded animals in toxic quantities. Whether they are used as animal systemics or not depends upon another factor. This factor is their safety to the domestic animal at a dose which can kill the invading pest or parasite. Because problems are so different on plants and in animals they are more easily discussed separately. Let's consider first the plant systemics and then the animal systemics.

Plant Systemics

Our present systemics are rath-

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er general insect poisons. The sucking insects and mites are most easily killed, however. These forms include aphids or plant lice, most scale insects and some leafhoppers. Such insects probably get more poison for their size by sucking up large quantities of sap containing the chemical. A few chewing insects are controlled but often this is because of direct contact or perhaps fumigation and not because they are acted upon by the systemics within the plant.

Chemical Designations

Most plant systemics belong to a class of chemicals called organic phosphates. One of the earliest phosphates was Schradan, a compound approved for use by the U. S. Department of Agriculture for cotton pests and for greenhouse insects, primarily to control aphids and some mites. A sulfur containing phosphate, demeton (trade name Systox), has also been approved and has had more extensive use on crops such as potatoes, beans, crucifers and legumes, particularly, alfalfa.

More recently two close chemical relatives of demeton, phorate (trade name Thimet) and Di-Syston have come into prominence. Their uses include seed treatment of cotton and alfalfa, and soil treatment for potato insects. Additional chemicals include Phosdrin, a potent insecticide which can kill an insect by direct spraying, yet exhibits some uptake by plants. Dimethoate, a new plant systemic, will also have some use as an animal systemic.

These systemically important organic phosphates are converted to closely related toxic compounds within plants. The compounds are usually referred to as active metabolites. A systemically active insecticide does not have to be an organic phosphate. There are chemicals known as carbamates which are systemics and a highly toxic chemical, sodium fluoroacetate which can behave systemically. Sodium fluoro-

Tornadoes have been reported in every state, except Nevada.

acetate is one of a few compounds which is highly toxic without being converted or metabolized to another compound within a plant.

Application of Pesticides

Systemic insecticides are applied as sprays like other insecticides because all of the current compounds or their metabolites are readily absorbed through the foliage. They are unique, however, because they can be applied to the soil or directly to the seed and will kill off many sucking injurious insects and mites pres-

ent on the growing plants. Other application methods peculiar to systemics include direct application to the bark of woody plants and to trunks of trees.

Common Uses In Practice

There are many uses of systemics which have been approved by pesticide officials of the U. S. Department of Agriculture. Probably the most extensive use has been as cottonseed treatments, particularly using the compounds phorate (Thimet) and Di-Syston. Demeton is widely used, particularly as a foliage application on alfalfa in the western and southwestern part of the United States. There are many other applications to vegetables and ornamental crops. At present, only demeton and Phosdrin are approved for use on fruit pests. Systemics are still less widely used than non-systemic insecticides.

Over 3,000 varieties of plants have been identified in coal deposits, 90% of which are similar to present plants.

Comparison of Systemics And Non-Systemics

The pesticidal value of a systemic would appear to be its longevity in a plant since it would not be subjected to wind, rain or strong sunlight. Most of the systemics do have effects which will last for some time. Phosdrin, in particular, is very short-lived because of chemical breakdown.

The systemics do have the ability to keep growing parts of a plant protected in contrast to a non-systemic material which is left behind with new plant growth. This is particularly important because many aphids and mites attack the succulent, fresh growth. Where seed or soil treatment is possible, the seedling plant can have protection from pests. It is during this early critical growing period when it may be practical to apply a non-systemic material.

The physiological effects on treated plants have not been studied as intensively as desired, but in general, plants do not seem to be greatly affected. There are a few cases of phytotoxicity (plant poisoning), particularly with seed treatment, but plant damage is not exclusive with systemics. If the plant tolerates the systemic at all, the quality and yield of the plant, in general, can be expected to be about normal.

Some workers point out that a great advantage of systemics is to minimize the hazard to beneficial organisms, particularly pollinating bees, desirable insects, birds and animal wildlife. This is not

true with all, however, and each compound has to be considered on its own merits or demerits. Demeton (Systox), for example, is one of the safer materials to use where bees may be active but it has rather high toxicity to warm-blooded animals. Hazards can be reduced, of course, by the method of application. For example, systemics which can be successfully used as soil or seed treatments do not present much hazard to organisms which are above the ground.

Human Hazard

We need to be certain that insecticides are used in a way which will ensure the safety of humans. This requires careful consideration when the pesticide is applied to an edible portion of a plant. Extensive tests have been run on residues of the pesticides on plants. Rats, guinea pigs, mice and monkeys are fed on plants or fruit of plants which have been treated.

When metabolic compounds are formed, their toxicity is determined and the rapidity of their disappearance is calculated. The approval for use of systemics on edible plants is made by two federal agencies. Approval has been slow because of the need to establish the safety of all compounds involved. Tests made must not only establish the immediate toxicity of a chemical but detect any possible prolonged or chronic toxicity. This cannot be done in less than 3 years of experimentation.

Future Outlook of Plant Systemics

There seems to be little question that there will be an increased use of pesticides in general with our current emphasis on increased production of crops per acre. The need for high quality is also an impetus to the use of materials which will make this possible. The interest in systemic materials is high in the field of pesticides and certainly will result in an increased use.

Because there are some disadvantages, as well as advantages with systemics, one can say that it is unlikely that the trend in the use of systemics will completely outdistance more conventional insecticides. Furthermore, there are new classes of potential insecticides which do not seem to behave systemically. Research and use is expected to continue with new pesticides. Beyond that, the search is also going to continue for biological organisms which may kill off pests. A broad out-

A worker honeybee will gather about a teaspoon of honey in her six weeks of productive life — and make about 35,000 flights for it.

look is needed to meet unexpected pest problems which will arise in crop production.

Animal Systemics

The greatest single stimulus to the use of animal systemics has been the desire to control cattle grubs. Cattle grubs are the larval stage of two kinds of flies. The most common one is called the heel fly because it lays its eggs on the hairs growing on the "heels" of cattle. The grubs are said to cause more than $100 million loss to the livestock industry in the United States each year.

The grubs burrow through tissues of young cattle cutting holes in the hide and damaging an estimated 14 million pounds of choice meat yearly. Such damaged areas have to be cut away and removed. In addition the adult flies frighten the livestock during the summer months so that both beef and dairy animals run about. They, thus, fail to gain as much weight or produce as much milk as they are capable of doing.

Lincoln said of agriculture: "No other human occupation opens so wide a field for the profitable and agreeable combination of labor with cultivated thought."

The cattle grubs cause a tremendous loss in quantity and quality of beef. But, you may say, why are systemics of such importance? The reason is that we had never been able to prevent the grubs from invading the cattle until the systemically active materials came along. Now it is possible to eliminate 90 to 100 per cent of the grubs before they have a chance to get into the backs of the animals. These chemicals can be used at doses which will kill the grubs but not harm the domestic animal.

What Are The Insecticides?

Two organic phosphates are in commercial use for application to beef cattle. They are ronnel (trade name of Trolene) and Co-Ral. Widespread tests from at least 20 states have been made and in many areas two other compounds have been tested. They are Dowco 109 and Dimethoate. The latter compound was briefly discussed under plant systemics. One additional material looks very promising and has the advantage of killing off many internal worm parasites of cattle, sheep and goats. However, further tests are still needed with this material.

How Are The Materials Applied?

The livestock systemics can be applied in at least four different ways. First, boluses or capsules can be given by mouth using a

balling gun to start it down the throat. This method is recommended for ronnel (Trolene). Secondly, the animal may be sprayed or dipped so that the insecticide is applied to the animal skin. Spraying is the preferred method for applying Co-Ral, using liquid pressures of from 250 to 500 pounds. This method also appears appropriate for Rueline, a compound which requires further testing.

A third method, injection of systemics intramuscularly or subcutaneously, has given favorable results. This method is not quite as acceptable to some cattlemen because of individual handling and need for a veterinarian. A fourth method, mixing the insecticide in food or salt, has had a number of experimental trials, particularly with ronnel and to a lesser extent with Ruelene. Such a method has had considerable success but has not had approval of federal authorities.

General Uses of Animal Systemics

Despite the fact that cattle grub control has assumed great importance in promoting systemics, there are a number of other livestock pests that can be controlled. Cattle lice are easily destroyed. Reduction in numbers of mites is possible, though dosages may have to be increased in some cases. When sprays are used during the summer, the horn fly of cattle is controlled.

One other major pest of the south, the screw-worm fly, is also controllable with systemics. This pest invades wounds in cattle, sheep and goats so a localized treatment seems preferable even with a systemic. The possibility of controlling internal parasites other than insects has only appeared promising as a result of testing with Ruelene. However, no others have been effective against roundworms or tapeworms.

Comparison with Non-Systemics

The use of animal systemics has been rather revolutionary. Previous surface insecticides used for cattle grubs, particularly the material called rotenone, had to be replaced because they were not giving satisfactory results. Something new had to be found. The non-systemic insecticides have given generally satisfactory results on external parasites such as lice and horn flies. But, the control of internal parasites is not possible with conventional insecticides; in this respect the animal systemics have a more unique value than do plant systemics.

Man and the pig are two of the very few animals whose eyes are not luminous at night.

Future Outlook of Animal Systemics

Although effectiveness of systemics for certain pests is quite well documented, there are still two major considerations that have to be taken into account. These are in respect to widespread usage of animal systemics. The most difficult one appears to be incentive to use systemics under our present marketing and production schemes.

For example, if you were a farmer raising beef cattle which had become infested with cattle grubs you would probably need some incentive for getting rid of the grubs. You might think that the livestock buyer should pay you a premium for ridding your animals of grubs. However, when you sold grub-free animals you might find that your neighbor who did nothing about the grubs was able to get as good a price for his animals as those you marketed. It is also quite possible that your treated animals did not gain any more weight than some untreated animals. Therefore, there was no incentive.

The greatest trapping area of U. S. (in volume) is the Louisiana swampland.

As a buyer of beef cattle from western markets you might think that the rancher should treat the animals with systemics before he sells to you. But he needs some financial incentive, too. Thus we find that most livestock buyers at present are not discriminating between treated and untreated animals, or grub-free and grub-infested animals. There are one or two companies which do pay small premiums but this is not general.

The second consideration about extended usage is safety in use for human food consumption. This refers to the fact that any chemical which is used in beef cattle or with milking animals will have to be shown to be safe. Enforcement of the safe use is done by the Food and Drug Administration of the United States and by our State Department of Agriculture.

With the present interest it appears that the use of animal systemics will go ahead on a fairly large scale despite the difficulties pointed out. Some farmers will be slow in adopting the practice of using systemics but future use appears to be assured.

Farming is the most dangerous major industry based on the total number of accidental deaths. On the basis of the death rate per 100,000 persons, farming ranks third, exceeded only by the mining and construction industries.

Think Twice About Hogs In 1960

Hog outlook is for lower prices in 1960's than in 1950's. High summer price peak is probably gone forever.

Condensed from Nebraska Farmer

Harold F. Breimyer, Agricultural Marketing Service, USDA

HOG prices are down and their outlook for the next year is not bright. It certainly does not favor overall expansion in the hog industry.

What the outlook favors for the individual producer will, as always, depend on his operation — his facilities, his feed supply, and what it costs him to produce hogs. One thing is sure — all plans should be made with the prospect of receiving lower prices for hogs in 1960 than in the last 3 years.

Today's rising production of hogs, as well as cattle, sheep, and chickens, is largely in response to big feed supplies and lower feed prices.

The trouble is that production moves up in sudden sharp leaps, not smoothly. That is what is happening in hog production now. The 1958 pig crop — spring and fall combined — increased 7½% from 1957. Last year's crop was up 10% more, for a big increase in 2 years.

These fast increases have a marked effect on prices. Rising supplies of hogs on the market cut prices of barrows and gilts in the Midwest to $14 per 100 pounds this past July. They were $24 in early July, 1958.

The $14 hog price in July, normally a high price month, was an overcorrection. Prices recovered somewhat in August. Nevertheless the July break means two things. First, it signals the beginning of a period when prices of hogs will be lower than during most of the 1950's. We won't see $20 hogs again for quite a while.

The abundance of feed at lower support prices will almost certainly result in a big livestock production that will hold all meat animal prices below recent favorable levels.

The second thing that $14 hog prices in July means is that the very high summer price peak, long a feature of trading in hogs, is probably gone forever.

Hog producers have broken

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away from their old habit of concentrating farrowings in a few months. Now they are distributing them more evenly throughout the year. As a result, both the old summer scarcity and the fall glut in market supplies have disappeared. To be sure, seasonal differences in supplies and prices remain, but they are less extreme than before.

For instance, note how farrowings were distributed in 1948 and in 1958:

	1948 Percent	1958 Percent
December-February	10.5	20.6
March-May	50.2	35.0
June-August	17.7	23.6
Sept.-November	21.6	20.8

In 1948 half of all farrowings were in March, April, and May. Now only a third are in those months. December, January, and February were low in 1948. Since then that period's share has doubled.

In one sense, smoother seasonal farrowings merely move a few dollars of price from one season to another. On the other hand, stability in the supply and price of pork strengthens the demand for it. So there is a benefit in smoother farrowings.

Marketings of hogs from the large 1959 pig crops began in late September and October. Because numbers marketed will be consistently larger, prices will be lower in the next 12 months than in the past year.

But because of smoother seasonal supply, prices are not expected to bounce around much in the year ahead. Instead, they may hug fairly close to the lower level now being established.

This fall, for instance, prices probably will fluctuate within a rather narrow range. Their low, which could occur as early as October, will be lower than the July price. Prospects are, however, that prices won't approach the December, 1955 low of about $10.50.

Nine percent more fall pigs are planned by farmers. Market supplies of hogs next fall and winter may not be up as much as last winter. Then marketings were increased by an unusually large number of spring-farrowed hogs held for delayed sale. But even so, lower prices than this past winter and spring are foreseen.

The big question concerns prospects for the spring crop of 1960 and for prices when hogs from that crop are marketed in the fall.

Several factors point to an increase in spring farrowings in 1960. Low hog prices will tend to choke off a rise, but may not prevent it entirely.

A further increase in farrowings next spring would seriously

endanger hog prices in the fall of 1960. Prices this fall, at best, will be on the borderline of acceptability. If more pork were to be produced by next fall, price problems would be multiplied.

More pork next year would probably reduce hog prices further. The hog market is sensitive to changes in supply. Since the end of World War II, an increase of 10% in pork supply per season has resulted in 22% reduction in the price of hogs. Moreover, pork will meet more competition from beef next year, as cattle slaughter rises.

To the industry as a whole, there would be a reward for avoiding overexpansion in 1960. To hold production steady, or cut it back a bit, would set the stage for a price upturn. After 2 years of decline, recovery late in 1960 would be most welcome.

Here Are Goals To Shoot For —

The poultry husbandry department of Cornell University has projected the following production goals for New York egg producers:

▲ *Rate of Production* — 240 eggs per hen (hen-day basis.)

▲ *Feed Efficiency* — 4½ to 5 pounds of feed per dozen eggs.

▲ *Flock Replacement Costs* — Below 8 cents a dozen.

▲ *Labor Efficiency* — One man per 5,000 birds on wholesale market basis.

▲ *Housing and Equipment* — Good enough to encourage high production and labor economy without excessive costs.

▲ *Marketing* — Sell 97 percent of eggs produced. Sell 95 percent as grade A or better.

▲ *Poultry Health* — House 95 percent of pullets started. Keep laying flock mortality at 10 percent.

▲ *Business Management* — Make broader use of records as a basis for sound management decisions.

Some of these goals may seem a little high. However, the Cornell poultry folks point out they are not long-term goals — they are fairly immediate. They say, "We can not afford the luxury of being nostalgic about the past and neither can we set static goals. These goals will require regular adjustment."

How does your efficiency measure up to these goals set up for New York producers? —*Poultry Tribune*

Feed Those Heifers For Growth

The older heifers, not the calves, are most often neglected . . .

Condensed from Hoard's Dairyman

R. S. Adams, Dairy Specialist,
Pennsylvania State University

SEVERAL research studies suggest that dairy heifers raised on a feeding level as low as 65 per cent of feeding standards may produce as much, if not more, milk than those raised on a normal and above-normal level of feeding.

Other experiments indicate that overfed heifers may produce 20 per cent less than normal fed heifers.

The question is complicated. In more and more herds, poorly grown-out heifers are preventing the progress which can be made through improved breeding, feeding, and management.

During the past several years, work with more than 100 dairymen having production problems found under-sized herd replacements to be at the root of the problem in the majority of these herds.

Not Young Calf Problem . . .

In 1956 we started an interesting study of growth in all D.H.-I.A. herds in a county with a noticeable replacement problem. Even though most of the 711 animals measured were grade cattle, we found that calves up to 6 months of age were normal in size according to growth standards for the respective breeds. Growth was classified as poor in less than 6 per cent of the herds.

However, the picture was not as rosy for the finished herd replacements. Growth of most 2- and 3-year-old milking heifers was below standard. In fact, growth of milking heifers was classified as poor in 33 per cent of the herds. On some farms young animals in milk were 400 pounds undersized.

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Hoard's Dairyman, 28 Milwaukee Avenue, West, Fort Atkinson, Wisconsin

We realize that a portion of this lack of size may be due to inherited differences. It has been shown that, as animals become older, inheritance exerts an increasingly greater influence on body size.

The study in this county, nevertheless, verified our observations that the herd replacement problem results from improper feeding and management of older heifers rather than young calves. The damage is done when the calves are removed from milk or replacer feeding and are left to struggle on their own.

Herd Averages Down . . .

In an attempt to determine to what extent milk production may be affected by a poor job of raising heifers, we compared D. H.-I.A. production averages for herds in which growth was classified as standard or above with those of poor growth herds. Butterfat production for herds with standard growth or better averaged 394 pounds as compared to 344 pounds for herds with poor growth.

This difference of 50 *pounds of butterfat* production per cow yearly for the entire herd can mean a lot. Let's assume that butterfat is worth $1 per pound. In a herd of 25 cows the difference in income would amount to 25 times $50, or $1,250 per year. This difference in income can more than pay for the little extra feed and attention needed to do a satisfactory job of raising dairy heifers.

Larger Heifers Produce More . . .

We were able to further study the relationship of size of heifers to milk production when all D.-H.I.A. record-keeping in Pennsylvania was converted to electronic processing. In our D.H.-I.A. program all milking animals are tape-weighed to the nearest 100 pounds by the supervisor at his first visit after the animal has freshened.

A summary of the data obtained from all 2-year-old heifers in a 12-month period is given in the table at the end of this article. All production figures have been adjusted to a 2x, 305 day mature equivalent basis to remove the slight age differences.

This new flu is an ill something that makes everybody blow good.

Other studies indicated that the average age of the animals in this population was about 28 months. There was very little, if any, difference between the mean ages for each weight group. For example, Holsteins weighing less than 900 pounds averaged 28 months of age as did those in the 1,200-pound group.

Butterfat records for Guernsey heifers weighing 1,100 pounds or over were 101 pounds higher than those for animals taping less than 800 pounds. Similarly, the butterfat records for Holsteins 1,300 pounds and up were 115 pounds greater than those of heifers weighing under 900 pounds.

These differences mean that, on the average, each increment of 100 pounds in body-weight resulted in a 23 to 25 pound increase in butterfat production for Holstein and Guernsey heifers respectively.

Our findings are essentially in agreement with those obtained by Wisconsin, Washington State, and British researchers. Undoubtedly better over-all feeding and management of the herd is responsible for part of the differences noted in small versus larger heifers.

The nighthawk migrates from Alaska to Argentina and back each year, making the longest known migration of a land bird.

The dairyman who does a good job with young stock also may do a superior job with his entire herd. However, the trends are too pronounced to soft-pedal differences in rearing intensity to any great extent.

Average Growth O.K. . . .

An estimate of the weight of the milking heifers included in this study reveals that Guernseys tape-weighed about 900 pounds and Holsteins 1,050 pounds on the average. These estimates and the distribution of numbers above and below the solid lines of the table suggest that our dairymen, as a group, are doing a satisfactory job of growing out replacement heifers.

Some 32 per cent of the Guernsey and 52 per cent of the Holstein heifers are under acceptable breed standards. Only 4 to 7 per cent of the animals, however, are drastically undersized.

Much To Gain . . .

These data suggest that there is much to gain by making certain that our heifers are well grown-out. It appears that for every dollar spent in extra feed and care for replacement heifers, you can expect about $1.70 in return. This is a pretty good rate of interest.

Several dairymen with whom we have worked can readily attest to the value of doing a good job with their young stock. In more than one instance, herd averages were increased by 70 to 150 pounds of butterfat when replacement programs were improved and milking heifers fed right after freshening.

Too many of us fail to feed the milking heifer for growth as well as maintenance and milk production. Even a well grown-out animal has about 25 per cent of her growth ahead of her when she freshens for the first time. Both 2- and 3-year-olds need extra grain beyond production requirements to satisfy growth needs.

Research has shown that heifers as much as 200 pounds undersized at first freshening will produce satisfactorily and regain much of their weight disadvantage if fed properly after calving.

Avoid Overcrowding . . .

There is a marked difference between growthy heifers and overconditioned ones. Growthy animals should have size and scale, but be relatively free from patchiness and other signs of overconditioning. Overfeeding to the extent that heifers become noticeably fat (beefy, throaty, flabby over the shoulder and tailhead) can be detrimental in several aspects.

The rapid loss of this flesh, which often occurs after freshening, might make the heifer more susceptible to ketosis or acetonemia. The chances of difficulty in conceiving and calving might also be increased in an extremely fat animal.

Putting on excessive fat and then milking it off is a rather uneconomical process as well as an unhealthy one. It takes about 3.53 pounds of total digestible nutrients (T.D.N.) to put on one pound of gain. However, only 2.73 pounds of T.D.N. results when the pound of flesh is milked off. This loss of 23 per cent in T.D.N. is not good for the pocketbook as well as the cow.

The greatest disadvantage from overconditioning stems from a possible loss in milk production. Animals that are well grown-out, but not overconditioned, may produce as much as 23 per cent more milk than overfed heifers.

According to several research reports and field studies, it appears that underfeeding to the extent that heifers may be 200 pounds or so undersized may not seriously impair milk production. However, milk production may be adversely affected if a heifer is carrying merely 150 pounds of extra flesh in the form of fat.

If you're too busy to pray, you're too busy.

Similar to severely-stunted animals, we find very few instances of overconditioning of heifers in the field. Overconditioning appears to be a greater problem in show cattle than in the usual commercial herd.

The goal of a sound young stock program should be to raise heifers that are not overconditioned, but of sufficient size to breed for calving at 24 months of age or sooner. Preliminary reports of research underway at Cornell University suggest that well grown-out heifers can be bred to freshen under 24 months of age.

One good dairyman has consistently bred his heifers at 13 months of age without any apparent loss of production or increase in calving difficulties. He is getting as much as 6 months more production than the average dairyman. This cuts down on replacement costs, one of the higher overhead items on a dairy farm.

Keep a good eye on your future herd. Young stock do not require pampering or fancy feeds and housing. Let's remember, however, that neglect of these younger animals can lead to production problems or prevent us from making progress. Yes, proper feeding and care of replacement heifers pays big dividends.

Underfed heifers produced 100 pounds less . . .

Breed & body weight	Number records	% Total records	2X 305 M.E. Milk	Fat
			Lbs.	Lbs.
Guernsey:				
under 800 lbs.	204	6.6	7,061	341
800 lbs.	785	25.2	7,661	368
900 lbs.	1,193	38.4	8,058	392
1,000 lbs.	683	22.0	8,482	414
1,100 lbs. & Up	244	7.8	9,166	442
Total or Aver.	3,109	100.0	8,072	391
Holstein:				
under 900 lbs.	483	3.7	9,841	369
900 lbs.	1,977	15.1	10,822	408
1,000 lbs.	4,361	33.3	11,576	438
1,100 lbs.	3,626	27.6	12,219	461
1,200 lbs.	1,967	15.0	12,612	478
1,300 lbs.	699	5.3	12,797	484
Total or Aver.	13,113	100.0	11,857	446

Solid lines represent a practical breaking point for animals above or below usual growth standards for the respective breeds.

Size As A Factor In Beef Cattle Productivity

Size carries some weight. The trend in breeding promises some benefits.

Condensed from
Texas Livestock Journal

H. H. Stonaker, Department of Animal Husbandry, Colorado State University

IT CAN be demonstrated that the size of the commercial beef animal is a factor in determining net income produced from each 100 pounds of beef.

This appears to be well substantiated in some cost analyses made on individual unselected steer progeny sired by 20 different purebred bulls varying in size.

Earlier analyses had shown that cattle of inherently different sizes had approximately the same efficiency of feed utilization and produced carcasses with about the same carcass cut-out values. It was also learned that cows of these different sizes required feed proportionate to their body sizes.

It is widely appreciated that size is a characteristic which is very responsive to selection. One can quite easily shift from small to large, or from large to small or intermediate size rather quickly by straight selection methods. The real problem remains, is there a most economic size to breed and if so what is it?

In computing the costs and returns on these cattle which had not only individual feed consumption records but also individual carcass cut-out values when the cattle reached the finish required by choice, new cost-return relationships became apparent which were not fully realized earlier. One departure in this analysis was to charge against the individual calf his proportion of the over-all herd cost plus the cost of feed which his dam required, in addition to his own handling, feed and marketing costs. The ranch costs were checked by a number of ranchers in both the plains and inter-mountain regions; costs of feed were computed over a 10-year period as priced at Denver.

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The value of the cattle was based also on 10-year average prices on the Denver market for the good and choice grades of steer beef. Net returns were computed on the basis of each 100 pounds of beef produced by the different animals in the study. In this way it was hoped to avoid some of the pit-falls of computation of costs on a per head basis, although in ranch and feedlot operations there are certain unit costs which cannot be avoided such as veterinary fees per head, taxation per head and equipment costs per head, to name a few.

Among the traits in which there were greatest differences in income groups were initial weight, a reflection of weaning weight, and slaughter weight. It will be noticed, too, that sires of most profitable calves were considerably larger than those of unprofitable calves.

It would be unsatisfactory to assume that the relative importance of these different factors producing fat yearling beef would necessarily apply to producing fat two year olds. It is widely known that the thinner calves and yearlings will make faster grass and roughage gains than those calves or yearlings with a greater degree of condition. Some ranchers take advantage of this situation by selling their own heavy fat calves which not only weigh more but also grade higher because of their greater condition and replace these fat heavy calves with thin light ones for grazing purposes. This situation would seem, however, to be a means of exploiting the rancher who is unable to produce heavy calves. It is difficult to conceive of a situation where with the calf crop being the same, it would be profitable for a rancher to produce light thin calves rather than heavy calves with higher condition.

The situation thus looks encouraging for the use of bulls weighing 1,800 to 2,200 pounds in mature form, providing the calves from these bulls are out of heavy milking mothers. It takes

One of the best germicidal agents known is common, ordinary soap, which offers a reasonable protection against germs.

the combination of ability to grow with the abundant milk supplied by excellent mother cows to produce choice fat yearlings which will yield the greatest profit. On the other hand, it appears that this same kind of cattle can very effectively go into the yearling trade and continue to produce a carcass that will be sufficiently light to meet

the broad demands for choice and prime beef.

From the cow side of the picture just selecting for greater size will not assure the desired improvement in mothering ability necessary to wean these heavy calves. In our own experience two strains of breeding that have consistently raised the heaviest weaning calves have mother cows of moderate size. Our largest strain of fastest gaining cattle are also good mothers, but we have had experiences with large strains which have been poor milkers

10 HIGHEST AND 10 LOWEST INCOME HEREFORD STEERS
(Selected out of 118 individually fed steers from the Colorado Agricultural Experiment Station. Ranch and Feedlot Costs Included)

	High Income	Low Income	High/-Low
Net Income/100 Lbs.	+$3.00	—$3.68	
Initial Weight	510	270	.53
Initial Grade	4.4	3.7	.84
Slaughter Weight	951.	696.	.73
Slaughter Grade	4.4	4.2	.95
Feedlot Gain	441.0	426.0	1.03
Daily Gain	2.27	1.88	.83
Days to Finish	195.	226.	1.16
Feed per Gain	7.3	6.6	.95
18 Months Weight of Dam	721	779	1.08
Age of Dam	5.4 yrs.	5.2 yrs.	.96
Age at Weaning	228	182	.80
Estimate of Mature Weight of Sires	1730.	1360.0	.79

Prices of beef carcasses of different weights and grades in Chicago (average 1946-52).*

Grade	Weights 400-500 lb.	500-600 lb.	600-700 lb.	700-800 lb.
Choice	$48.28	$48.49	$48.60	$48.41
Good	45.64	45.53	45.58	45.40
Commercial — now known as Standard	42.01	41.24		

*From PMA-USDA reports on western dressed fresh meats.

and mothers. Thus just by selecting for large size one does not automatically get the greater weaning weights. This important characteristic of mothering ability apparently must be selected for directly in itself.

It is my opinion that in selecting for the maximum weaning weight under a given set of range conditions, the matter of cow size will more or less take care of itself. For example, if we should tend to begin breeding the cows too large to successfully maintain themselves on sparse range conditions, this would be reflected in lighter calf weights and a smaller calf crop. Such replacements would automatically be selected against. In breeding for optimum calf crop we should be able to obtain the optimum cow size.

A productive job for a winter day is to prepare a farm map showing your tile drainage system. The map will serve as a record when the system is expanded, when maintenance is needed or when the farm is sold.

There is evidence that even under adverse range conditions often experienced by the New Mexico Station, the larger cows are the more productive. This applies particularly to calving percentage but also to the weaning weights. Large cows produced a 93.8 percent calf crop whereas smaller compact cows produced only an 81.6 percent calf crop. At Colorado, Comprest cows averaged a 72 percent calf crop whereas Conventional type cows averaged 80.3 percent. (Based on live calves weaned/-number of cows exposed to bulls). Size of bull apparently had no effect on percent calf crop in the Colorado trials.

One interesting contrast in the beef trade as compared with the pork and lamb market is the great latitude in weights of carcasses taken at the same price. Over a period of years the market data indicated that almost the same price per pound was paid for carcasses of the same grade but ranging in weight from 350 to as much as 800 pounds. To substantiate this one may note prices reported on the Chicago market for the period 1946-1952.

Slaughter tests where steers are fed to a constant finish indicate little if any differences in carcass cut-out values, a surprising result in view of the blockier, thicker appearance of the small cattle.

The fact that smaller cattle gain as efficiently as larger cattle was another surprise in these experiments. This holds when the

cattle are of approximately the "same finish." Fatter cattle generally have lower percentages of loin and round than do cattle with less condition.

How far do we go before we go too far in breeding bigger cattle? These are questions soon needing answers.

1. Selecting for fast daily gains is partially a reflection of mature size of cattle which may be associated with no true increase in efficiency or shortening of the length of time on feed. To what extent is this important?

2. How much size can we get before cattle lose in adaptability, particularly in regions of sparse feed supply?

3. Breeding for more size eventually will result in heavier carcasses. Can slaughter at younger ages counteract this? Will processors handle these at no discount?

At this time the trend in breeding for more size in beef cattle seems to carry beneficial effects. Through further research and investigation incorporating the whole scope of production and consumption the beef producer will be fore-warned before he has gone too far in this direction.

Eggs Through The Years

Here is the average price, per dozen, received by U. S. farmers since 1940 for eggs:

For 1940, 18.0 cents; 1941, 23.5 cents; 1942, 30.0 cents; 1943, 37.1 cents; 1944, 32.5 cents; 1945, 37.7 cents; 1946, 37.6 cents; 1947, 45.3 cents; 1948, 47.2 cents; 1949, 45.2 cents; 1950, 36.3 cents; 1951, 47.7 cents; 1955, 38.9 cents; 1956, 38.7 cents and 1957, 35.2 cents.

University of Illinois economists have figured that the average price received per dozen eggs is the second most important factor in determining net management earnings. Are you getting above or below average price for your eggs? Is there any way you could get more for your eggs such as selling on a grade instead of current receipts, retailing your eggs, or selling to top wholesale accounts?

—Honegger Fax

Importance of Horsepower On The Farm

A survey of the various types of farm horsepower and what they mean to you . . .

Condensed from
Farming In South Africa

Dr. S. J. P. Van Heerden

THROUGH the years quite a number of misconceptions have arisen in regard to the term horsepower, which may confidently be described as the alpha of modern farm mechanisation. This is due mainly to the various interpretations of this term, necessitated by the development and use of power plants.

Today the term is used so vaguely and carelessly that data on the capacity of power plants can be interpreted very misleading, no distinction frequently being made between terms such as indicated (h.p. = horsepower), belt h.p., power take-off h.p. and rated h.p., etc.

In this article we will try to indicate the difference between the various types of horsepower, especially those relating to farm mechanisation.

A farm tractor is normally able to provide the following three forms of horsepower — drawbar h.p., belt h.p. and power take-off h.p. Similarly, the draught requirements of various units of farming machinery are indicated in the same terms according to the type of drive required.

Term "Horsepower"

A proper understanding of the term h.p. (as it is used today) is essential. The term itself is misleading, in that it really has very little to do with the tractive force exerted by a horse. The maximum load a horse can pull is of little concern here. The term is used as a standard to indicate the *rate* at which work can be done continuously. The time factor therefore plays an equally important part.

The term horsepower was coined by an English scientist and inventor, James Watt, also known as the "father of the steam-engine." Watt's steam engine gained considerable ground as a power plant towards the end of the 18th century and he introduced the term as a standard

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in order to be able to compare his machine's capacity with that of other power units of his time.

He adopted one foot-pound per minute as the unit for measuring capacity. According to this standard a power unit has a capacity of one foot-pound/minute if it is capable of lifting a weight of one pound one foot in one minute. A man who can load 33 bags of wheat weighing 200 lb. each onto a trailer 5 feet high every ten minutes, therefore has a capacity of 33 x 200 x 5 divided by 10 = 3,300 foot-pounds per minute.

James Watt estimated that a strong English horse should be able to work at a rate of 33,000 foot-pounds/minute and this amount of capacity he called "one horsepower".

The U. S. Government owns about half of Montana.

Research in America has shown that a man's capacity is approximately 1/10 h.p. The above-mentioned example is therefore a good indication of the rate at which a man should be able to load bags of wheat onto a trailer.

In the case of mechanical power machines the idea of continuous output is more appropriate and of great importance. We are not so much interested in the total output as in the *rate* at which a particular job can be done.

Types Of Horsepower

In order to distinguish the type of horsepower which is of importance to the farmer from the other types, a brief survey of the various types of horsepower is advisable. The six most important types are the following: indicated h.p., friction h.p., brake h.p., belt h.p., drawbar h.p. and power take-off h.p.

Indicated h.p. This h.p. value gives an indication of the imperfections of an actual engine as compared with the calculated capacity of a theoretical machine of the same dimensions. It is, furthermore, an indication of the energy developed within the cylinder of an engine. The compression in the cylinder is measured for this purpose and used as a standard. The losses which occur in the transmission systems up to the point where the power is delivered, are not taken into account.

Friction h.p.: The friction resistance which the moving parts of an engine offer to transmission, absorbs a certain amount of the power developed by the engine. It is lost in the form of heat and is therefore not available for use. A portion of the engine h.p. therefore has to be giv-

en up for this purpose.

Brake h.p.: is a more familiar term, which is of practical value to the farmer. It is an indication of the capacity which is available to the crankshaft or flywheel of the engine. This h.p. value together with the friction h.p. should therefore give the indicated h.p. The brake h.p. is determined by means of a dynamometer which measures the rotating power of an engine.

Drawbar h.p.: This type is certainly the most useful form of horsepower in the farming industry. The ability of a tractor to make tractive power available to its drawbar is expressed by this value. The important point in this case is that the ability of a tractor to pull forward a certain load at a certain *speed* is indicated.

Belt h.p. The application of the belt h.p. of an engine is made possible by the use of an endless belt and a set of belt pulleys. Certain losses occur, however, with this type of power transmission, with the result that less belt horsepower will be available to the driven belt pulley than to the driving pulley.

Power take-off h.p. The last of this group of horsepower types also indicates a rotating power. In this case, however, the applicability of the power is measured by direct coupling to a power shaft. The power shaft is driven through a gear system from the crankshaft. The losses occurring in the transmission system concerned, cause the power take-off h.p., as in the case of the belt h.p. to be lower than the brake h.p. of the engine.

As indications of capacity, the maximum values of useful horsepower types are of little significance to the farmer, since it is a well-known fact that the life of an engine run at its maximum capacity will only extend over a few years.

Do Cattle Sweat ? ?

Most breeds of cattle in the United States have a small number of sweat glands in their skin. These glands, however, are rudimentary in all except one breed of cattle. The American Brahman alone possesses full functioning sweat glands which enables it to sweat freely through the pores of the skin. This sweating ability contributes materially to the breed's unusual heat tolerance.

Other breeds of cattle sweat through the membranes of the nose and mouth. This accounts for the readily apparent "panting" seen in most cattle when temperatures soar. —*Extension Service*

How Low Are Farm Prices?

Despite costly government efforts to bolster them, farm prices are near the lowest levels in 15 years . . .

Condensed from The Wall Street Journal

FARM commodity prices have fallen to within a whisker of their lowest level in a decade and a half.

They have fallen despite a multi-billion-dollar effort to bolster them.

And they have done it in an era when the average of all other prices has moved steadily higher.

Government price indexes are based on the 1947-49 average as 100. The Labor Department reported its wholesale farm price index at 86.8 as of October 27, a fraction of a point above a week earlier but within the low range where it has held for several weeks. With the index of all wholesale prices combined at 119.3 in the October 27 week, the index for non-farm (and non-food) products was 128.6.

Down 13%, Up 28%

Thus farm prices have fallen more than 13% since 1947-49. And non-farm prices have climbed over 28% in the same period.

The farm price index fell to 82.9 at the close of 1955. When it goes through that level it will be the lowest since price ceiling days of World War II.

Prices on a number of key farm staples have slipped notably since early last year. Hogs that brought $25 a hundred pounds last year sold recently at $13.50. Eggs that topped 50 cents a dozen in the wholesale market last year were under 35 cents. Corn has sagged from $1.40 a bushel to the $1.10 neighborhood.

From Meat to Nuts

Behind the price weakness is mammoth production. This extends straight across the board on almost all farm products. It is not confined to such widely publicized crops as wheat and cotton.

The table below shows how drastic has been the rise in production of major farm commodities since just before World War II. Figures are indexes of physical volume of farm marketings, based upon the 1947-49 average as 100.

Reprinted by permission from The Wall Street Journal, Chicago 90, Illinois

	1940	1959		
Meat Animals	83	126	Up	51%
Dairy Products	87	119	Up	36%
Poultry and Eggs	64	159	Up	148%
Feed Crops	74	174	Up	135%
Vegetables	79	110	Up	39%
Fruits and Nuts	87	113	Up	30%

More impressive than the production gain itself is the fact that it has been accomplished with a sharply contracting number of people at work on farms.

The farm population in 1940 was about 30 million. By 1950 it had shrunk to 25 million. It is now only a little above 20 million. That's a shrinkage of a third in less than two decades, a shrinkage of a fifth in less than 10 years — all while production was leaping steadily higher.

A vast substitution of machines for muscle has made it possible. Today's farms are dotted with all sorts of machines that simply didn't exist two decades ago. Among them — automatic unloading feed wagons, self-propelled combines, corn picker-sheller combinations, four-row plows and cultivators (some now span eight rows), combination corn planters and fertilizers, hay balers that pick up hay, tie it, then toss it into wagons, all automatically, and automatic cotton pickers.

To pull all this equipment little tractors first replaced the mules and horses. Now big tractors are replacing the little tractors. About 45% of all tractors made in the first half of 1959 were 50 horsepower or more. As recently as 1949 only 1% were that powerful.

As the machines have taken over, the number of farms, like the number of people on them, has shriveled sharply.

A million farms have ceased to exist as separate entities just since 1950. Nearly two million have vanished in 20 years. There are only about 4,645,000 individual farms in the country today. That's a decline of about 27% from the 6,350,000 of pre-war 1940.

This does not mean a big decline in total farm acreage. It has been largely a matter of some farms absorbing other farms. At around 1.1 billion acres today, total land in farms is actually up 100 million from the pre-war 1940 total.

Smelling is not the only function of the nose, for it moistens and filters the air that passes through it.

Some Facts of Life

The combination of soaring production and falling rural poplation adds up to some little noted but fundamental facts of life about today's farm economy.

High volume holds the total farm dollar crop from marketings

at a near-record high, despite falling prices. And the shrinking population means a briskly rising dollar harvest per farm citizen and per farm.

The table below tells the story. Total farm marketings are in millions. Farm population and number of farms are in thousands. The marketing figure for 1959 is an estimate.

	1950	1959
Total Marketings	$28,512	$32,700
Farm Population	25,058	20,827
Marketings Per Capita	$1,137	$1,570
Number of Farms	5,648	4,645
Marketings Per Farm	$5,048	$7,040

The above figures on marketing income, of course, do not include Government payments under the price support program. Nor do they include income received by farm folks from non-farm jobs or business. Government payments have been about a billion dollars a year for the past two years. Non-farm income of farmers last year was $6.2 billion.

Farmers Keep Buying

There's little evidence that falling farm prices are putting any brake on farmer buying. International Harvester Co., major maker of farm implements, reports sales by its retail dealers running 30% above a year ago. A banker in the heart of the Imperial Valley in California (top farm marketing state) figures farmer buying now "possibly as much as 5%" above 1958.

Continued buying of more land by farmers suggests, too, that lower prices don't worry them too much. It is estimated that 40% of the farm land purchased last year was bought to enlarge existing farms — up from 30% in 1954.

This buying is done at steadily rising prices. Farm land values are now more than 60% above those of 1950 and 25% above those of 1955.

Where is the big farmer market? Actually it is far more concentrated geographically than generally realized.

Four kingpin farm states, with farm product sales of over $2 billion each, accounted for almost 30% of all the farm marketing dollars in the country last year. The big four, with last year's marketings by each, follow.

State	1958 Marketings
California	$2,829,463,000
Iowa	2,559,999,000
Texas	2,372,620,000
Illinois	2,083,779,000
Big Four Total	$9,845,861,000

The top dozen farm states, including the four above, had aggregate marketings last year of over $19 billion — or about 56% of last year's total U. S. farm marketings of $33.5 billion. The eight following the big four are: Minnesota, Nebraska, Kansas, Wisconsin, Missouri, Indiana, North Carolina, and Ohio.

There's an interesting footnote to the farm income story. In the fiscal years 1946 and 1958, Government losses under the farm price support program came to $10.5 billion. That tops the value of a full year's farm marketing — of hogs, cattle, crops, eggs, milk and everything — by the nation's four giant farm states.

Problems Multiplied in Farm "Milk Factories"

Concentration of large numbers of dairy cows, equipment, and labor into relatively small areas intensifies the problems of design, investment, labor management, and sanitation; a U. S. Department of Agriculture research engineer said recently. Large-scale dairy enterprises, such as cow-pools, need up-to-date engineering methods if the dairymen expect to stay in business.

Large dairies — 400 to 1500 milking cows — such as those in California and Florida, may become more widespread in the near future, he said. Because most of these large dairies operate on hired labor, it is necessary to have well-engineered layout of buildings, lots, lanes, and gates to promote labor efficiency if the enterprise is to be profitable.

At big dairies, just getting the cows to and from the milking area is a problem. Traffic control can be aided by time and travel studies that tend to eliminate bottlenecks.

Care of cows and efficiency can depend on the fatigue of the milker. Three-year records of a 960-cow dairy in California showed that the dairy herd could produce more milk, be milked more rapidly and with less labor, in elevated stalls rather than in floor-level stalls, the engineer said.

The production difference was largely due to the extra care given cows milked in the elevated stalls by workers who were less tired because they did not have to squat or stoop.

The production difference between the two systems was great enough so that the original stall barn was torn down and replaced by an elevated stall system. Original cost of the string barn is expected to be made up in less than one year by the increase in production expected from cows in the new elevated-stall layout.

—New Mexico State University

How to Measure Wool Shrinkage

How much shrinkage in your wool?

Condensed from The Dakota Farmer

AN easy-to-use method will allow wool growers to calculate shrinkage on their own clip, provided it is graded. The only equipment needed is a platform scale, steel tape, and a little practice with the formula.

The method has been developed and simplified by the Wool Department of the University of Wyoming at Laramie, Wyoming. Shrinkage now can be determined by three measurements and a formula. When applied to a group of five bags of graded wool the calculated shrinkage will be within nearly 1¼% accuracy. With 10 bags of graded wool, the accuracy improves to within less than 1%.

Shrinkage tests on commercial sized bags of grease wool show that the shrinkage can be estimated by taking (1) the weight of the wool in the bag, (2) the length circumference of the bag, and (3) the estimated unstretched staple length of the wool. These three factors account for 91½% of the total variation in shrinkage.

The weight of the wool in the bag should be carried out to the closest fraction of a pound.

The measurement of the bag is taken with a steel tape placed around the complete length of the bag from bottom to top to bottom. The Wyoming researchers take three measurements, spaced an equal distance apart, and use the average of the three.

The approximate unstretched staple length of grease wool, by classes, is: fine staples, 2½ inches and over; fine French combing, two inches; half-blood staple, three inches and over; half-blood French combing, 2½ inches; three-eighths blood staple, 3½ inches and over; three-eighths blood French combing, three inches.

The formula for calculating the shrinkage of grease wools can be broken down into seven steps.

1. Multiply the average net bag weight in pounds by 0.2449.

2. Multiply the average length circumference of the bags in inches by 0.2122.

3. Multiply the estimated un-

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stretched staple length of the wool in inches by 10.2282.

4. Add the results of the multiplication in Steps 1 to 3 together; then subtract 35.43 from the total.

5. Divide the answer obtained in Step 4 by the average net bag weight in pounds of the grease wool.

6. Multiply the answer obtained in Step 5 by 100.

7. Subtract the answer obtained in Step 6 from 100, and the remainder will be the shrinkage of the wool.

An example with graded fine wool will show how this formula works. Suppose the average net weight of the 10 bags in the lot for this example is 324 pounds. The average length circumference of the bags in the example is 178 inches. The average unstretched staple length is 2½ inches. The seven-step formula would be applied as follows:

1. 0.2449 times 324 (bag wt.) equals 79.35.

2. 0.2122 times 178 (bag measurement) equals 37.77.

3. 10.2282 times 2.5 (staple length) equals 25.57.

4. 79.35 plus 37.77 plus 25.57 equals 142.69; 142.69 minus 35.43 equals 107.26.

5. 107.26 divided by 324 (bag weight) equals .33.

6. 100 times .33 equals 33.

7. 100 minus 33 equals 67.

The shrinkage in this example will be about 67%.

This formula hasn't been tested on one-fourth blood or coarser grades. but there is no evidence that it won't work equally well on wools coarser than three-eighths blood.

Compare Self-Fed With Hand-Fed Cattle

Results of 13 research experiments at midwest agricultural experiment stations compare the results of self-feeding and hand-feeding beef cattle.

In these experiments, self-fed cattle gained .13 pound more a day, on the average, than hand-fed cattle, reports G. R. Carlisle, Illinois extension livestock specialist.

The self-fed cattle sold for slightly more per pound cost 26 cents more for feed per 100 pounds of gain and returned a net of 87 cents a head more than the hand-fed cattle in these tests.

In addition, Carlisle points out that a saving of labor is another advantage of the self-feeder system not covered in the research.

—Illinois Farm News

Phosphorus — Key To Good Seed

Learn more about this essential element . . .

Condensed from
Wisconsin Agriculturist

PHOSPHORUS is very essential to all life processes—growth, the making of sugars, the formation of blossoms, and the production of fruit and seeds.

Phosphorus concentrates mainly in the seed. A 45-bushel-per-acre corn crop stores 12 pounds of phosphorus in the grain. Such a crop needs about 200 pounds per acre.

If there is not enough phosphorus in the soil, stems grow weak and spindly and seeds shrivel. New growth steals phosphorus from older leaves. Leaves and stems may be tinged with red, the roots fail to branch out properly. The plants mature late.

Most plants can use only the phosphorus dissolved in soil water. There may be a large amount of phosphorus in the soil. But if it is not soluble, plants cannot use it.

The tiny root hairs of the growing plants absorb the soluble phosphate from the soil water.

In rich soils solid forms of phosphorus dissolve, replenishing the supply. The soluble phosphorus in soil water around the root hairs may be renewed 10 times a day.

Where does the soil get soluble phosphorus? Water soluble phosphate fertilizer becomes available as soon as it is dissolved in soil water.

Soluble phosphorus may come from decaying plant or animal residues and the weathering of native mineral materials.

The amount of native phosphorus in the soil may vary from less than 100 pounds to over 4,000 pounds per acre. In Wisconsin soils it is so low that you can generally forget about it.

Manure and crop residues add soluble phosphorus to the soil. A ton of manure contains about 4 pounds of available phosphate.

Phosphate fertilizer, manure and fresh residues speed up the

Reprinted by permission from Wisconsin Agriculturist, Racine, Wisconsin

growth of micro-organisms in the soil. The busy organisms break down humus and produce mild acids. This acid in turn frees phosphorus locked up in the soil. Adding soluble phosphate fertilizer, manures, or plowing under crop residues gives you an extra bonus. They make more soluble phosphate available to growing crops than these materials contain themselves.

What happens to the phosphorus you put in the soil in the form of manures, crop residues or fertilizer? Less than 20 per cent of the phosphorus is used by the crop the year you apply the phosphorus carrying material.

Much of it becomes tied up in complex chemical compounds, absorbed in clay particles, and held in soil humus. In acid soils this amount may be very great. Almost all of this phosphorus stays locked up as long as the soil is acid.

In well limed soils the soluble phosphorus attaches to the calcium part of the lime. Calcium compounds can be broken down into soluble forms so they gradually become available for plant use.

Much soluble phosphorus is quickly absorbed by tiny clay particles in the soil. The more clay in the soil, the more phosphorus absorbed. Plant roots can absorb some of this phosphorus on clay particles.

Soluble phosphorus is used by micro-organisms for g r o w t h. They may grab onto it before plants can get to it.

The micro-organisms will tie up a considerable amount of phosphorus if they must live on phosphorus deficient o r g a n i c matter, such as straw. But the phosphorus tied up in the bodies of the micro-organisms is released when they die.

Good corn is not a soil depleting crop where fertility is returned to maintain good corn yields. Also, heavy corn provides more ground cover for the winter than poor corn. Corn and beans can be grown in the normal proportions and yields maintained where erosion is not serious by simply maintaining fertility.

Gish Agricultural Service.

Phosphorus moves very little in the soil. Dissolved in water it may move an inch from where the fertilizer particle was applied, but very slow. Any phosphorus added to the soil as manure, crop residues or fertilizer is found in the top one foot of soil.

Much of the phosphorus is tied up in clay particles which dissolve easily in water. You can lose a lot of phosphorus by erosion. Since only a small amount of phosphorus is soluble at any

one time, you lose very little through drainage water. You can take a lot of phosphorus off your land in grain and hay. This is lost unless you return the manure back to the land.

You can build up the phosphorus in your soil by applying large amounts of manure, plowing under crop residues and using phosphate fertilizer. You can keep down the losses by holding down erosion. But this is only half the job.

You must also manage the soil so that there will be enough soluble phosphorus for rapid plant growth. How can you do this?

1. Keep the land sweet (a pH of 6.5 to 7) by liming. When you lime soils the calcium in the limestone exchanges place with phosphorus locked in other compounds. The phosphorus goes into solution.

Liming also speeds up the action of micro-organisms so they can break down the tied-up phosphorus into soluble form.

2. Make large applications of manure and soluble phosphate fertilizer. Besides adding soluble phosphate themselves they speed up micro-organism activity and unlock tied-up phosphorus.

3. Apply phosphate fertilizer in bands in the soil. Broadcasting or discing mixes the fertilizer unevenly enough to leave small areas in the soil that have little phosphorus. With the heavy concentration of phosphate around the bands, more phosphate goes into solution. Mixing superphosphate with manure makes the manure more efficient.

It is generally better to fertilize and plow down the fertilizer a month to six weeks before planting corn land. However, on heavier soils, particularly where sod is being turned, there will be little risk in applying fertilizer just before plowing.

Virginia Polytechnic Institute.

4. On soils on the acid side put the phosphate fertilizer on just before you plant the crop. On sweet soil you can put it on sometime ahead without cutting down too much on soluble phosphorus.

5. Keep up a balance of other plant foods in the soil.

6. On soils low in phosphate, put on an application every year. At first use heavy applications. Then you can taper off as the phosphate builds up in the soil. On low phosphate soils or clay soils a large part of the phosphate you apply at first may be tied up.

With the exception of sandy soils, you can build up reserves of phosphorus in the soil. And it will mean larger amounts of soluble phosphorus available for plant growth.

Use Common Sense About Feed Additives

Feedmen are putting good poultry health in the bag. Here's how to reap the benefits.

Condensed from
Everybodys Poultry Magazine

Fred W. Davis

WE used to think good feed, sanitation and management were the keys to rapid growth, freedom from disease, and good production.

While the need for these fundamentals has not changed, emphasis has shifted to the use of drugs as a necessary aid in achieving the desired goal in raising poultry.

Feed manufacturing has gone through some remarkable changes within the past few years, and will undergo even greater changes in the next few. However, it must be realized that older discoveries are just as important as recent ones and top performance can be obtained only by skillfully combining into a bag of feed the good one finds, both in the old and in the new.

Vitamins that prevent rickets, or trace minerals that prevent deformed toes, are just as much health products as the additives that change the course of infectious diseases. Yet, because their use has been so well established, they are not treated as drugs by the agencies regulating their use, but rather as normal required food elements. In the nutritional field there must be mentioned the nitrofurans, the antibiotics and the arsenicals which definitely speed growth and production processes when fed at low levels.

Today's record shattering performance of poultry flocks is a result of built-in nutrition and disease control in present-day rations. By maintaining productive health, such rations permit "bred-in" performance to be realized. Every day that a broiler flock side-steps disease is a growing day, and the birds are thus able to reach market weight in an ever-shortening growing period with an accompanying im-

Reprinted by permission from Everybodys Poultry Magazine, Hanover, Pennsylvania

provement in feed conversion.

Some estimate that as high as 90 percent of the feeds sold today contain some kind of medication. This is because of the demonstration of good results. The first report of growth-stimulating effect of an antibiotic or arsonic acid was made in 1946 with poultry. But it was not until 1950 that growth promoting effects of antibiotics were considered seriously, and several years later before the nitrofuran products were discovered to have similar effects on growth.

In general, the bacterial diseases have held the spotlight as far as feed medications are concerned. Many of these diseases produce little or no immunity following an attack, with or without treatment. This is where sanitation, vaccination, and management must play an important part in prolonging the effects of the medication.

Common Feed Additives

To understand fully the technical and scientific differences among feed additives would be a long course of study in itself. The list of additives now in use includes among others:

1. Nitrofurans.
2. Antibiotics.
3. Arsenicals.
4. Sulfas.
5. Coccidiostats.
6. Hormones.
7. Anthelmintics (wormers).
8. Tranquilizers.

To date too much has been said regarding the virtues of additives and to little about their short-comings. The nutritionist must be familiar with a wide variety of additives and how they will work in his feed products. The man actually doing the mixing must realize the dangers of over or under fortifying with any particular additive. The serviceman and feedman must know what can be expected of feed additives.

More important, the producer must be familiar with additives — their limitations and their values — for his own protection.

Keeping abreast of the additives that bombard the poultry industry is a challenge and responsibility requiring the grower to maintain a "be on your toes" attitude. An additive cannot be judged wholly on its price, amount of promotion or any other single criteria. Performance, price, availability, safety, compatability, palatibility and all

Production testing enables dairymen to determine accurately which of their cows are the most profitable.

other factors must be considered jointly.

Management and feeding procedures must work hand in hand with the use of any additive. There is no perfect drug that can be relied upon at all times to prevent or treat on a "hundred percent" basis the diseases which they are effective against. Some growers have relied so heavily on drugs in feeds that they become confused and unable to cope with conditions where the drug does not perform with absolute, complete effectiveness.

Factors To Consider

Safety of use is a prime essential with any drug. This factor is being achieved with some of the drugs now on the market. The nitrofurans, for instance, can be fed right up to market because the drugs do not build up in the tissues.

Electric brooders are most popular when 1,000 or fewer chicks are brooded. However, there are some installations where 10,000 to 20,000 chicks are brooded with electricity.

Some additives, while doing a good job of preventing diseases, have objectional features that can cause trouble if used for animals other than the ones intended — or even with animals of the same species, but of different ages.

Although the safety factors of most drugs have been well proved and the tolerance has been determined, the level of some drugs should be watched carefully. The amount of the active ingredient needed for treatment is sometimes very critical. Too small a dose will not be effective and may lead to development of resistance on the part of the disease organisms. Too large a dose, or continued use over a long period of time, may result in toxicity to the birds or animals being fed. Poultrymen should always follow the directions on the drug labels or feed tags. They will show a warning if special precautions must be taken.

Compatibility Is Important

Compatibility does not necessarily mean that two drugs are "additive" in effectiveness, or that the total effect is greater than the sum of the two. It simply means that the combination may be included in feed without harmful effects. There are, fortunately, a few additives that are compatible with all other materials commonly used in feed or water as poultry medication. Your feed manufacturer should know which ones can be mixed together safely.

To get the most benefit from

any drug the grower must be willing to follow feeding directions and keep close control over his feeding and management programs. When we classify growers as to how they use medications we find three groupings. The first includes those who believe that "if a little will do some good, a lot will do better." This can result in over-medication with detrimental results — or damage to the pocketbook simply because more was used than necessary.

The second group takes in those who figure that "my chickens look better so the medicine has done some good — now, I'll stop it and save myself some money." That is like pulling the pin on a hand grenade — the slightest jar may set off an explosion. These *suppressed* organisms might cause a recurrence of the disease.

The third group is made up of those who make an honest and sincere attempt to use good judgment and who follow directions of the feed or drug manufacturer.

Reducing Stress

The role of feed additives in reducing the effects of stress has become more and more important. Disease may reduce the appetite and lower absorption of essential nutrients to the point of creating a temporary condition of malnutrition, although the flock has access to a well-balanced ration. Valuable time can be lost in determining which came first — the disease or the malnutrition. The important point is to limit the loss of natural vigor and hasten recovery by putting the flock on a "booster" feed. The two classes of drugs most commonly used for such purposes are the nitrofurans and the antibiotics.

Periodic use of "reinforced" feed also bridges the conditions caused by weather changes, vaccination, moving of the flock, and other stresses. It permits birds to continue growth during these periods, but the greatest benefit is *preventing* secondary invaders from gaining a foothold.

About half a million acres of productive farmland in U. S. is lost each year by erosion; another million acres is taken up each year by roads, homes, factories, airfields, etc.

All-mash rations have been the accepted method of feeding for broilers for some time, and they are rapidly becoming the predominant program for feeding layers. Manufacturers of feed additives usually state requirements in terms of grams or milligrams per ton of total ration; in other

words, in terms of a complete mash, fed without grain. When a mash-grain program is followed, the amount of drug in the mash portion must be increased in proportion to the amount of grain fed. Otherwise maximum benefits will not be obtained.

If birds go off feed or if a disease outbreak occurs when birds are on the preventive level of a drug, the amount of drug in the feed should be increased. In some instances, medication must also be used in the drinking water. Often the tolerance level of a drug does not permit it to be doubled or to be fed at recommended level in both the feed and the water. The grower should be familiar with the safety of a drug so that he will know whether a level above the ordinary recommended usage is safe.

Future of Feed Additives

It is clearly evident that changes are ahead for the good of nutrition and medication. Growers must learn to interpret new findings and to accept and use these findings when they are proved correct. With the poultry industry becoming more and more specialized, poultrymen with the knowledge and skilled labor required for such specialized production, and the necessary capital resources, will be most successful.

Growers alert enough to investigate, evaluate and use new additives properly and in conjunction with proper management, will reap the benefits a good feed additive can offer. Common sense use of these additives will play an important part in achieving the most from them.

New Weapon Against Destructive Insects

Living insecticides, one of the brightest new developments in modern agriculture, will soon be another ally of farmers in their continual battle against destructive insects. These live insecticides include bacteria viruses, protozoa, fungi, and nematodes. They are applied in the same manner as chemical insecticides. How do they work? By attacking insect pests, causing them to develop fatal diseases. Several examples of this pest control method include a bacteria against the Japanese beetle, a virus against the alfalfa caterpiller, and a fungus disease against the spotted alfalfa aphid.

—The National Future Farmer

Don't Blame Agricultural Research!

Perhaps the greatest "Sputnik" we have in America is our agricultural surplus . . .

Condensed from Michigan Farmer

Richard J. Aldrich,
Michigan Agricultural Experiment Station

PRICE supports and surpluses are integral parts of agriculture in the minds of many people. And it's small wonder for there's scarcely a newspaper or magazine on the city newstand today which does not decry these agricultural "problems."

As a part of agriculture, research also finds itself in this public doghouse. Many blame it for our surpluses and question the wisdom of continued expenditures for such research. But let's examine the true role of agricultural research in the face of these criticisms and see what it means to our people in both town and country.

Surpluses Small Part of Total

Just how big are the surpluses? No one denies the presence of our great storage bins filled with surplus grains. Surpluses are a problem but a more desirable problem than shortage or famine would be. However let's not lose sight of the fact that surpluses in most commodities are only a small part of total production. In feed grains, for example, use in 1958 amounted to about 92 per cent of the year's production. And this use was about 50 per cent greater than total production just 20 years previous. Research made possible this most needed increase in production. But it merely provided the know-how — production was influenced by other factors, not the least being the government support program.

More than 50 per cent greater production in 1958 came from 3.5 per cent fewer acres than in 1938, with 10 per cent of our population on farms in 1958 compared to 24 per cent in 1938. Fewer hands needed to produce food and fiber has released workers to make television sets, washing machines, autos and the many other things that provide us with the world's highest standard of living. Farming efficiency appears to bear a relationship to standard of living — where farm-

Reprinted by permission from Michigan Farmer, 322 Abbot Road, East Lansing, Michigan

ing practices are poor there's usually a low standard of living.

Efficiency in farm production has other important implications for the nation. Research of the prior 25 years meant 4½ million more factory workers were available to war plants during World War II. Today's even greater agricultural efficiency may prove to be equally as important as military preparedness in discouraging another world war. Russia has 45 per cent of her people on farms as compared with our 10 per cent. The influence of this difference in availability of workers for military and other production is apparent.

Abundant Food Cheap

Agricultural research has helped provide an abundance of good food at reasonable prices. In terms of hours of work required to purchase each unit, food is much cheaper today than in the "good old days," and cheaper than in other countries. An hour's factory work in 1914 bought a pound of bacon. By 1959, one hour's work bought a pound of bacon, plus a loaf of bread and a dozen eggs. In Russia today, one hour's work buys only 4 eggs.

All of this supports an estimate that the food bill in the United States would have been 10 billion dollars higher in 1950 without the agricultural research of the preceding 10 years.

Although we now have surpluses research should neither halt nor falter. In fact, research must be speeded up to help find new uses, new crops and improved techniques for handling present production. Actually, an estimated 35 to 45 per cent more food will be needed by 1978 for our increased population. Much of this need can be met by putting present knowledge to use, but a substantial part will require new knowledge.

Research takes time. Basic research in particular may be slow to yield practical uses and the need for new knowledge falls especially in this area. Research started in the next decade must supply information for meeting increased needs in the 1970's.

The U. S. ranks 15th among countries of the world in per capita use of dairy products.

No Time To Stop Research

Unlike research in some other areas, agricultural research can not be turned on and off easily. For example, livestock in a breeding program can not be "kept on the shelf." A good deal of the present research on such things as insect and disease control is "protective," making possible good yields when soil, rainfall and other conditions are fa-

vorable. It merely maintains present yields. Standing still in the research effort on such problems would result in yield losses, since the pests do not stand still.

Our ability to produce farm products is without parallel in history. Agricultural research has made it possible. Without this research, all of us would eat less well and pay more for it, have fewer of the luxuries of life and be in a more precarious position in the cold war!

Estimating Concrete Needs For Farm Jobs

Ready-mixed concrete is sold by the cubic yard. Make your own estimate for the amount of concrete needed by following steps 1 and 2 below. This estimate allows an extra 10 per cent for waste and overrun.

Step 1. Measure surface area of job:
For flat work such as paved yards, floors and sidewalks:
Area=Length (ft.) x Width (ft.)
For Walls: Area=Wall height (ft.) x Wall length (ft.)

Step 2. Find the number of cubic yards by dividing area (step 1) in the following manner:

If you desire a concrete thickness of:	Divide area by:
1 in.	300
3 in.	100
4 in.	75
6 in.	50
12 in.	25

Example: You want a 4-in. thick paved yard 40x60 ft. How much concrete should you order?

Answer: 40x60 ft. = 2,400 sq. ft. (area).

2,400 divided by 75 (4 in. thickness from table above) = 32 cu. yd.

These tables were prepared by the Portland Cement Association. Further information on using concrete around the home and farm are available from your county agricultural agent or vocational agriculture instructor. —*Suffolk County Farm News*

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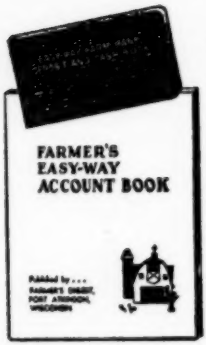

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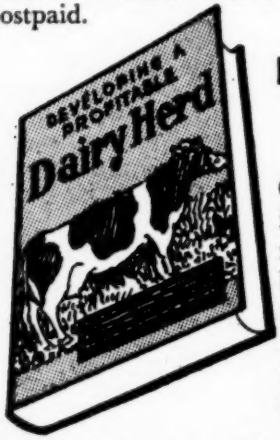

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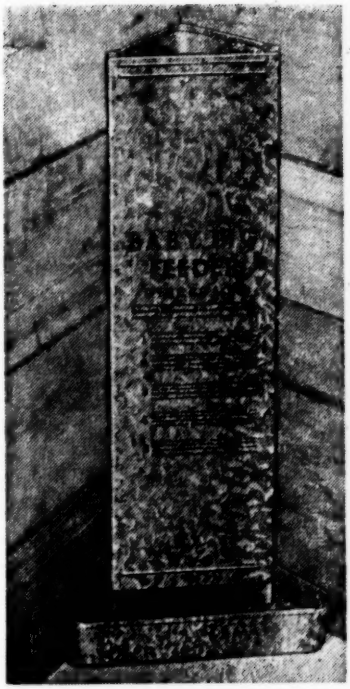

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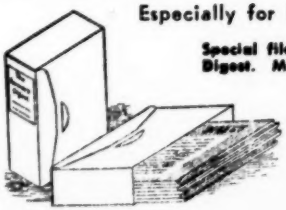

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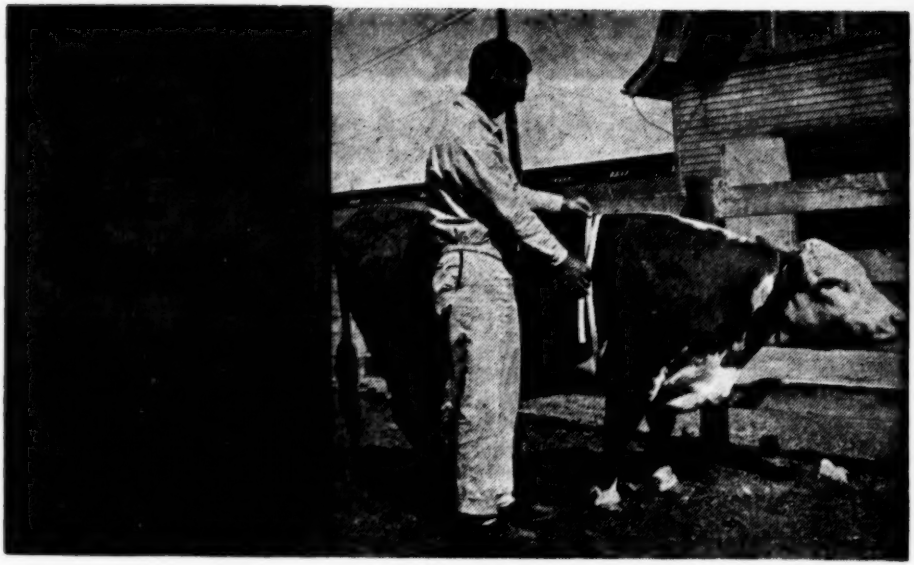

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